

DECEMBER 1958



# CHEMICAL PROCESSING

Thin-film evaporation whips  
problem, speeds pro-  
duction of ristocetin .... 34

Functional resin base makes  
bow ..... 59

Land's first synthetic rub-  
ber plant built in record  
time ..... 75

Monometers WEIGH liquids  
and solids ..... 103

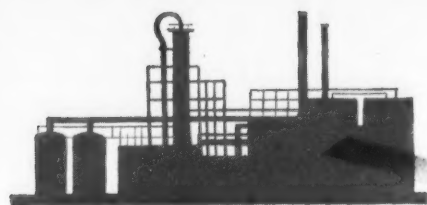
... also more than  
 terse reports on new  
 processing techniques, chem-  
 icals, instruments, equipment  
 ..... 6



'Personal Touch' Vital in  
**Exchanging Know-how  
Abroad** ... says Catalin's Krehbiel  
page 31

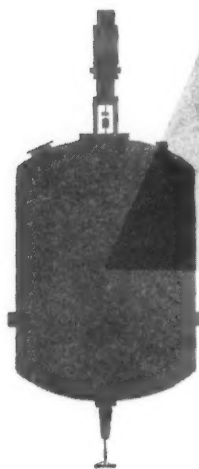
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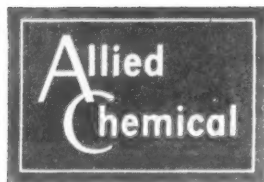


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Check 2673 opposite last page



### conventions and exhibits

**December 1-3.** American Society of Refrigerating Engineers, Semi-annual Meeting, Hotel Roosevelt, New Orleans.

**December 1-5.** 23rd National Exposition of Power and Mechanical Engineering, The American Society of Mechanical Engineers, Coliseum, New York.

**December 7.** Salesman's Association of the American Chemical Industry, Christmas Party, Waldorf-Astoria, New York.

**December 7-10.** American Institute of Chemical Engineers, Annual Meeting, Netherland Plaza Hotel, Cincinnati.

**December 8-10.** American Nuclear Society, meeting, Sheraton-Cadillac Hotel, Detroit.

**December 9-11.** Chemical Specialties Manufacturers Association, 45th Annual Meeting, Commodore Hotel, New York.

**January 26-29.** Fourteenth International Heating and Air-conditioning Exposition, Convention Hall, Philadelphia.

**January 26-29.** Plant Maintenance and Engineering Show, Public Auditorium, Cleveland.

**January 28-30.** Society of Plastics Engineers, Inc., 15th Annual Technical Conference, Commodore Hotel, New York.

**February 3-5.** The Society of the Plastics Industry, Inc., 14th Reinforced Plastics Division Conference, Edgewater Beach Hotel, Chicago.

**February 15-19.** American Institute of Mining, Metallurgical, and Petroleum Engineers, Inc., Annual Meeting, San Francisco.

**February 18-19.** Chemical Market Research Association, meeting on textile chemicals, Dinkler Plaza Hotel, Atlanta, Georgia.



... Meetings and shows of interest to the chemical industries

March 2. Louisville Federation of Paint & Varnish Production Clubs, Annual Symposium, Sheraton Hotel, Louisville, Ky.

March 2-6. Tenth Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy, Penn — Sheraton Hotel, Pittsburgh.

March 13. American Institute of Chemical Engineers and the American Chemical Society, Sixth Annual Joint Technical Meeting, Lamar State College of Technology, Beaumont, Texas.

March 16-20. American Institute of Chemical Engineers, National Meeting, Chalfonte Haddon Hall, Atlantic City.

March 16-20. National Association of Corrosion Engineers, National Meeting, Sherman Hotel, Chicago.

March 31-April 2. 21st Annual American Power Conference, sponsored by Illinois Institute of Technology, Hotel Sherman, Chicago.

April 5-10. American Chemical Society 135th National Meeting, Boston.

April 5-10. International Atomic Exposition, Public Auditorium, Cleveland.

April 20-22. The American Oil Chemists' Society, Spring Meeting, Roosevelt Hotel, New Orleans.

May 3-7. The Electrochemical Society, Inc., meeting, Sheraton Hotel, Philadelphia.

May 10-13. American Institute of Chemical Engineers, meeting, Kansas City, Mo.

May 17. American Society for Testing Materials, Seventh Meeting on Mass Spectrometry, Statler Hilton Hotel, Los Angeles.

June 1-5. Fifth World Petroleum Congress Exposition, Coliseum, New York.

June 9-12. The Material Handling Institute's Exposition of 1959, Public Auditorium, Cleveland.

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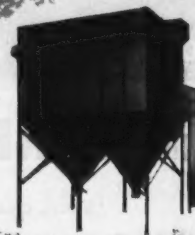
TYPE OF COMPANY	NUMBER OF ORDERS	TOTAL DRACCO UNITS PURCHASED
chemicals	49	60
chemicals	13	28
chemicals	17	25
chemicals	14	19
refractories	35	54
refractories	8	27
mining	8	90
rubber	37	48
cement	15	31
stone products	14	15



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|--|----------------------------|
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| 2. Nitrogen rich petroleum residue.    | 5. Phenol tar.             |
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with which is combined  
CHEMICAL PROCESSING PREVIEW  
and Chemical Business

*For the management team*

*More than 50,000 copies of this issue*

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December 1958

No. 12

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Editorial Staff—page 6

Advertising Representatives—page 197

CHEMICAL PROCESSING serves members of the Management Team in these industries:

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Fertilizers

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Check 2675 opposite last page



over the editor's  
shoulder



### Fusion in 20 years?

Many experts believe that thermonuclear power will be a reality in 20 years. Being an optimist, I'm inclined to agree — and hope that it comes even sooner than that.

Imagine the effects fusion power will have on industry and the home! When it arrives, mankind will have, for the first time in history, an **unlimited** source of energy.

One of the big advantages is that fuel costs will be extremely low. Deuterium at present, costs about \$140 a pound to produce. If its nuclear energy content could be completely converted into electrical energy, a pound of the stuff could yield 40 million kilowatts of electricity! Estimated gross fuel cost would be only 0.0035 mills per kilowatt.

Of course, most everyone is aware of the potential benefits of controlled fusion. At the recent Geneva atom conference, sessions on the subject attracted the biggest audiences. One of the most important accomplishments to come out of the meeting was agreement for complete international declassification of fusion work. Surprisingly enough, Russia took the lead in this.

With the cloak of secrecy removed, the door is open for international cooperation on a large scale. This should eliminate duplicate investigations and most certainly speed up the fusion time schedule.

Because of the important impact fusion power would have on the chemical industry, CP editors are constantly keeping an eye on work being done in this field. As in the past, we will continue to pass on to you news of important developments.

T. F. Maibee

Associate Editor



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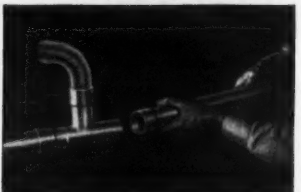


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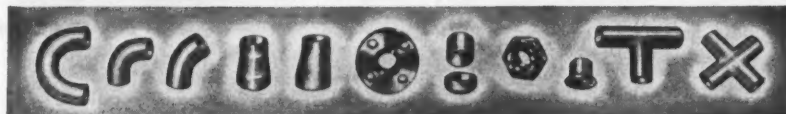


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Check 2676 opposite last page



# highlights

**CHEMICAL  
PROCESSING**

DECEMBER 1958

VOLUME 21 • NUMBER 12

## CHEMICAL BUSINESS

Acquiring Foreign Know-How — R. Landau & T. P. Brown . . . .	27
Pesticides: Indicted by Ignorance — Jack Vernon . . . . .	29
'Odd Balls' Can Make the Team, Too — E. M. Kipp . . . . .	30
Trading Ideas with Foreign Companies — Harry Krehbiel . . . .	31

## U. S. and WORLD PETROCHEMICALS

First Synthetic Rubber Plant in England Is On Stream . . . . .	75
One Compressor Does Work of Eight . . . . .	80

## NEW PROCESSING TECHNIQUES, MATERIALS and EQUIPMENT

### NEW SOLUTIONS OF PROCESSING PROBLEMS

One man operates pneumatic polyethylene conveyor . . . . .	32
Compressors amass 7000 hr of trouble-free service . . . . .	33
Turbulent-film evaporation boosts drug yield . . . . .	34
Aluminum-bronze alloy combats chloride corrosion . . . . .	36
Celanese smooths handling with skip hoists . . . . .	41

### CHEMICAL MATERIALS

Trifunctional trimellitic bids for resin berth . . . . .	59
Opens door to broader exterior use of PVAc paints . . . . .	68
Graft polymerization on brink of going commercial . . . . .	93
Microwaves control water pumps at Olin Mathieson . . . . .	96

### PROCESS INSTRUMENTATION & LABORATORY APPARATUS

Manometers weigh viscous liquids, solids . . . . .	103
No motor needed to operate valve actuator . . . . .	110

### CORROSION CONTROL

Corrosion coupons inserted, retrieved under pressure . . . . .	117
Caustic, salt air meet match in Monel insulation netting . . . .	120

### MATERIAL HANDLING & PACKAGING

Simplified waste control through self-dumping hoppers . . . .	129
Pneumatic conveyor can be wheeled to job . . . . .	136

### PROCESSING EQUIPMENT

Dust-free grinding in small space . . . . .	143
Sealed-end rotary steam-tube dryer doubles as reactor . . . .	148

### PLANT ENGINEERING, MAINTENANCE & SAFETY

How Trubek gets high-temperature heating flexibility . . . . .	158
Lubricants overcome heat, moisture on paper machine . . . . .	164

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## THIS MONTH'S COVER

Putting greater emphasis on human relations is one of the surest ways to make successful arrangements for the exchange of technical information between U. S. companies and foreign firms, says Harry Krehbiel, president of Catalin Corporation of America. On page 31 he discusses the various types of licensing arrangements which can be worked out, and describes pitfalls which must be avoided for successful consummation of agreements.



## REGULAR FEATURES

Conventions & Exhibits	2	Nuclear Notes	24
Spotlight on People	7	Engineering Data	53
Letters from Readers	10	Recent Books	174
Watching Washington	13	New Literature	178
Our Growing Industry	16	Advertisers Index	195

## SPECIAL READER SERVICES

• For more information on articles and advertisements in this issue, check the Reader Service slip opposite last page

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## Spotlight On People

DR. J. ROSS TUTTLE is appointed vice president of International Division of Allied Chemical Corporation. In Solvay Process Division, DR. ROBERT H. REED becomes director of research and DR. HERBERT C. WHOLERS assistant director. DR. ARLIE P. JULIEN is named chief of application research. In Barrett Division, DR. JOHN N. COSBY becomes director of research and development.

THOMAS E. MOFFITT, HOOKER Chemical Corporation president, is named chief executive officer. Action taken by board of directors upon recommendation of R. LINDLEY MURRAY, board chairman, that Mr. Moffitt succeed him in executive officer's post.

DR. WILLIAM H. SCHUETTE, general manager of The Dow Chemical Company's Midland Division, is elected vice president of company. He will continue his divisional duties.

HARRY B. WARNER is named vice president, marketing, of B. F. Goodrich Chemical Company. He succeeds JAMES C. RICHARDS JR., now vice president, sales, B. F. Goodrich Industrial Products Company.

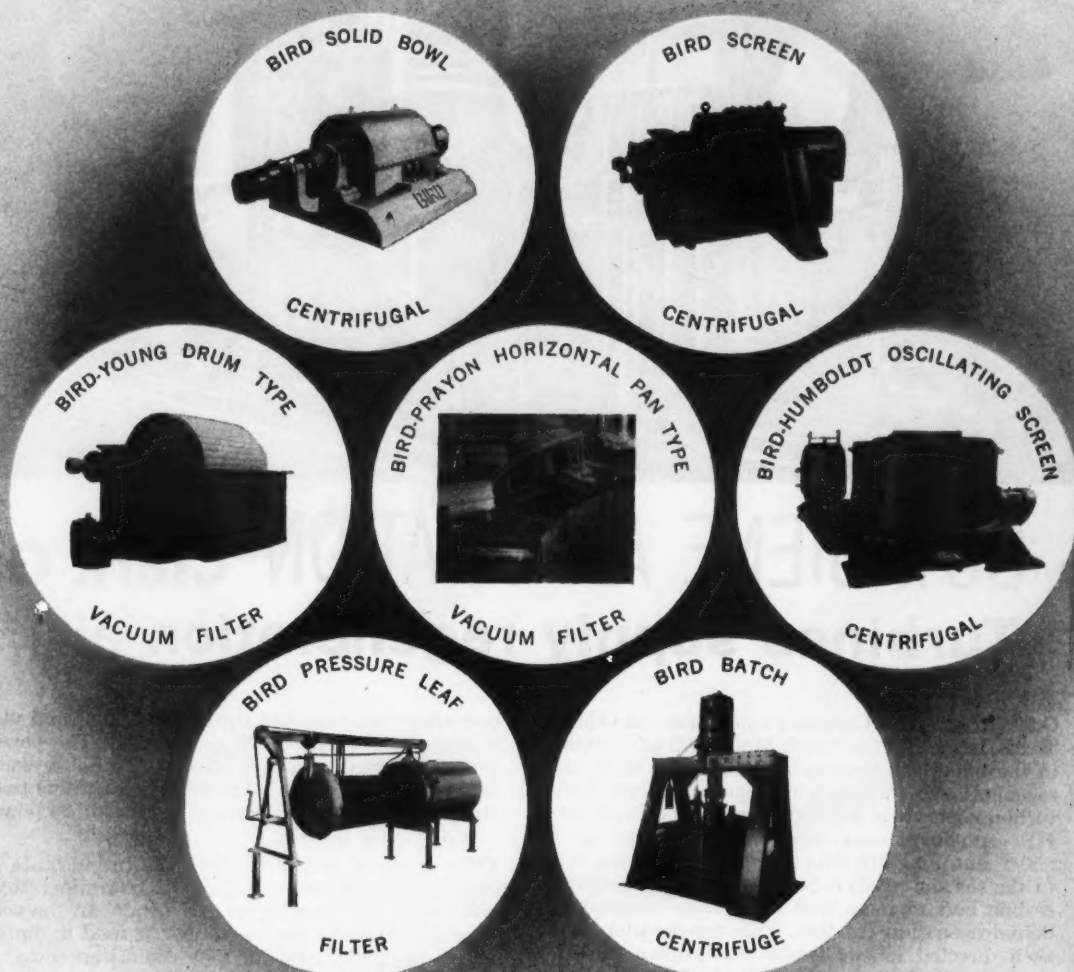
In reorganization of marketing functions at Mallory-Sharon Metals Corporation, GRAHAM B. BROWN becomes head of marketing team; G. B. LEVAN, general sales manager for titanium and special metals; WILLIAM G. FETTER, general sales manager, zirconium, and LELAND W. LONG, manager of marketing research.

JOHN S. PILLSBURY JR. is named director of Minnesota and Ontario Paper Company.

C. O. DAVIDSON is appointed general sales manager of Carbon Black and Pigment Division, Columbian Carbon Company, and J. W. SNYDER becomes division's technical director.

At Monsanto Chemical Company, PAUL LOGUE becomes

# Which of these SEVEN Solid-Liquid Separating Methods does your job at lowest cost?



Which of these is truly the most economical filter for the job, depends, of course, on *your* particular requirements of cake dryness, filtrate clarity, wash and volume of throughput.

In any case, it pays to *know* whether it's an existing filtration operation or one that's in the planning stage.

There's one quick, easy, sure way to find out. Ask the Company that engineers and builds all seven types. Their answer will be unbiased and backed, if need be, by pilot scale tests in one of the world's finest filtration laboratories — the Bird Research and Development Center.

# BIRD

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SOLID-LIQUID SEPARATIONS

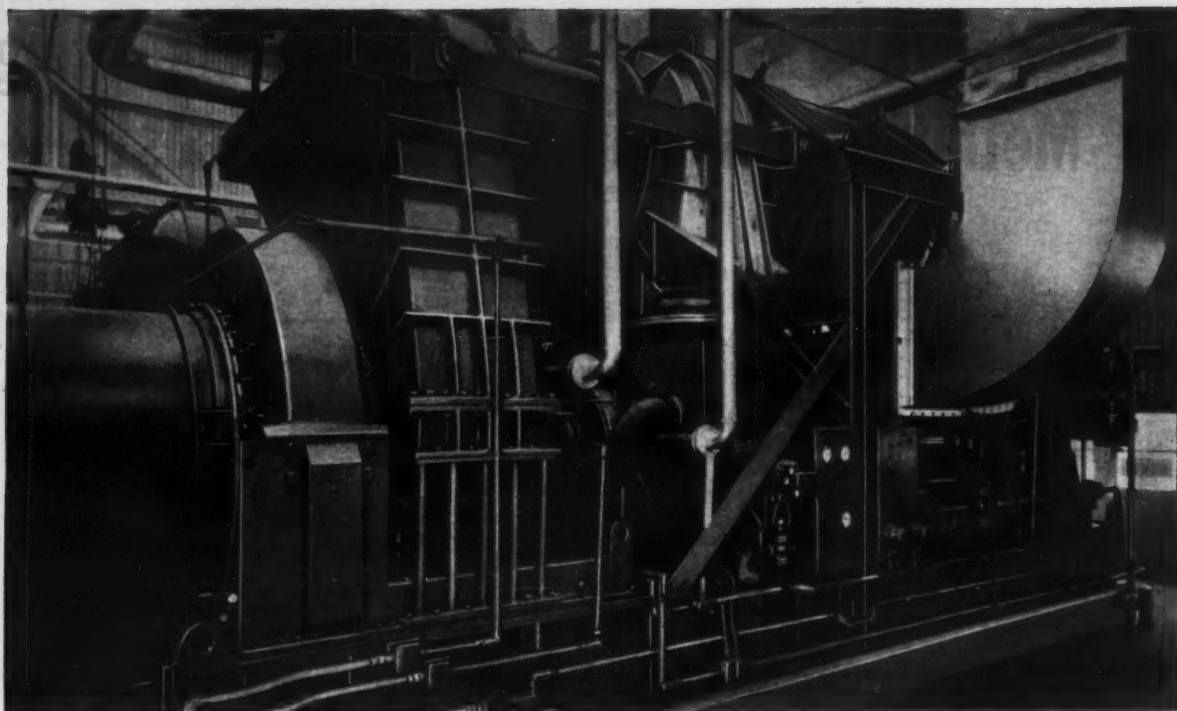
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## In BUTADIENE APPLICATION Clark Gas Turbines supply regeneration air

Odessa Butadiene Company's new plant at Odessa, Texas, integrates two Clark Model 305 gas turbines in the butadiene process by using them to furnish regeneration air to the dehydrogenation unit. These turbines operate in parallel, along with a Clark 3900 HP centrifugal compressor, and discharge air at 950°F and 22 PSIA into a direct fired heater, then to the reactor catalyst beds where the air removes carbon and replaces heat lost in the endothermic dehydrogenation reaction. This regeneration air is then directed to two waste heat boilers where it generates 186,000 pounds per hour of 250 psi steam.

Clark gas turbines were selected for this application because of better over-all plant economics which resulted from savings in fuel coupled with lower maintenance and operating costs. This plant is an

operating testimonial of the dependability and versatility of the Model 305 gas turbine. The power turbine has been removed to allow the hot pressurized gases to be exhausted to the process, rather than convert the energy of the gases to mechanical power as is normally done.

Other services in which Clark gas turbines are in continuous operation are: catalytic reforming, ethylene production, and power generation. In the very near future, additional units will be used in repressuring projects in the Near East and Venezuela.

Clark gas turbines are available in sizes of 1150 to 9300 HP, and are precision engineered and built for the ultimate in dependable and economical heavy duty service. For complete information on Clark gas turbines, contact your nearby Clark representative, or write today for Bulletin 163-1 to Clark Bros. Co., 5415 Lincoln Avenue, Olean, New York.

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Sales and service outlets in principal cities throughout the world



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Odessa Butadiene Company is owned jointly by El Paso Natural Gas Products Company, W. D. Noel and E. G. Rodman of Odessa, and the United Carbon Company.

Check 2678 opposite last page

### PEOPLE

manager of market research in development department of Research and Engineering Division. **JAMES C. BARNETT** is appointed manager, technical service, food and dentifrice industries for company's Inorganic Chemicals Division.

**JOHN C. BIERWIRTH** is elected vice president of National Distillers and Chemical Corp.

**CARL A. SETTERSTROM** joins Sun Oil Company's Research and Development Division as assistant director, commercial development.

New sales manager for Electro Metallurgical Company's Fine Metals and Chemicals Division is **T. R. EVANS**. Electromet is a division of Union Carbide Corporation.

**DR. WILLIAM L. FINK** is promoted to newly created post of scientific coordinator at Aluminum Company of America's research laboratories.

**GORDON E. COLE** is named manager of general sales for Air Reduction Chemical Co., a division of Air Reduction Co., Inc., and **CHARLES O. HER-**



*"These results are absolutely indisputable, gentlemen! But shouldn't you have left us a loophole to crawl through, should our competitors explode them?"*



## PEOPLE

MAN is appointed manager of technical sales.

Appointment of ROBERT HABERMEHL JR. as technical service director for Girdler catalysts is announced by Chemical Products Division of Chemetron Corporation.

At American Viscose Corporation's Film Division, DR. GEORGE W. LOW JR. is appointed manufacturing manager, and EDWARD L. WOOLLEY is promoted to newly created position of chief engineer.

PAGE EDMUNDS is appointed assistant general manager of chemicals in W. R. Grace & Co. Davison Chemical Division, and concurrently is named vice president of Davison Chemical Company, Ltd., Canadian affiliate of division.

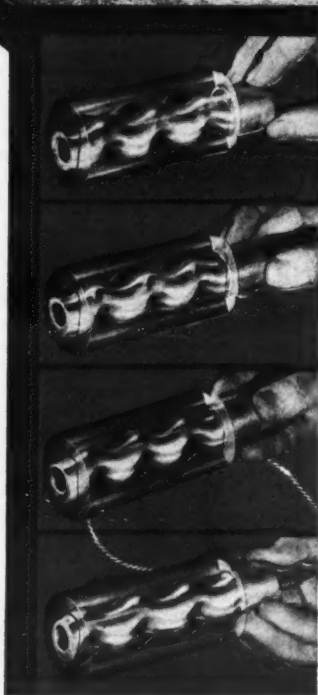
JOSEPH D. LOWERY is appointed assistant general sales manager of Industrial Chemicals Division, American Cyanamid Company.

At Celanese Corporation of America's Plastics Division, EDWARD W. MELVIN is appointed assistant director of sales of Resin Products Department.

DR. WESLEY D. SCHROEDER is promoted to manager of product research for activated carbon and industrial chemicals in the Research and Development Department of Pittsburgh Coke & Chemical Co.

SunOlin Chemical Company has been formed as joint subsidiary of Sun Oil Company and Olin Mathieson Chemical Corporation to produce urea. Company's office is at 100 West Tenth St., Wilmington, Del. Principal officers are JAMES I. HARPER, Sun Oil, president, and S. S. JOHNSON, Olin Mathieson, vice president. Directors from Sun are CLARENCE H. THAYER, CHALMER G. KIRKBRIDE, JOSEPH T. WILSON JR. and Mr. Harper, while those from Olin Mathieson are DONALD W. DRUMMOND, JOHN O. LOGAN, WILLIAM B. COPELAND and Mr. Johnson.

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A PIPE...A MOYNO<sup>®</sup>  
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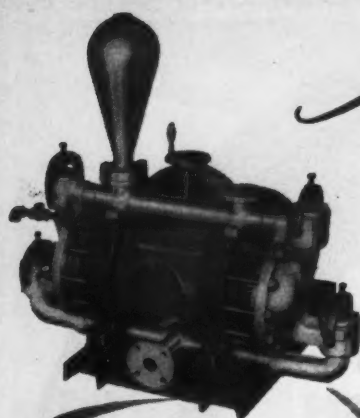


MOYNO PUMPS



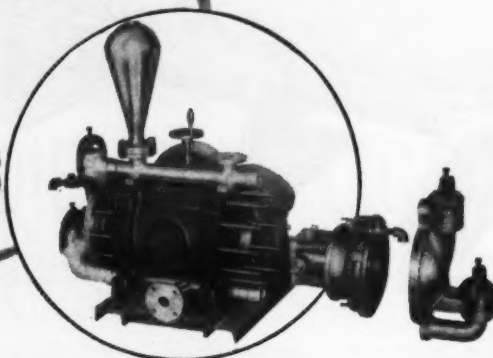
PROPELLER FANS

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# New FEATURES INCREASE SERVICE LIFE

**SHRIVER  
TYPE SP-DUPLEX  
DIAPHRAGM  
PUMP**  
for those  
**"TOUGH"  
MATERIALS**



- Simplified drive and diaphragm support mechanism increase operating life and facilitate maintenance.
- Complete diaphragm support mechanism may be removed as a unit, without disturbing existing piping.
- Liquid ends may be removed easily for inspection and cleaning.
- Slurry blow-off protects pump in event of diaphragm failure in operation. Slurry cannot affect working mechanism.
- Adjustable stroke—optional—available for varying pump capacity; without need for expensive variable speed drive.
- Pumps at discharge pressures to 100 psi, lift of 10' of water for long periods, 15' to 18' for short periods.

Learn why this double acting, positive displacement, piston pump is right for your "hard-to-handle" service—corrosive abrasive, viscous, thick, heavy, quick-settling or sensitive. Write for Bulletin 143.

## T. SHRIVER & COMPANY, INC.

846 HAMILTON STREET • HARRISON, N. J.

SALES REPRESENTATIVES IN: Chicago, Ill.—Decatur, Ga.—Houston, Tex.—Detroit, Mich.  
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SLAB FORMERS • DIAPHRAGM PUMPS • ELECTROLYTIC CELLS

Check 2680 opposite last page

## letters from readers



## Barleycorn butts noggin? that's no way to talk

But it is, insists reader after consulting handbook and finding that section on "Units and Conversion Factors" brings "great intellectual delight"

Ever heard of "Chaldron Ell Slug?"

Well, we didn't either until a "Letter to The Editor" came in recently bearing this quaint signature.

The letter was of such character that we felt it should be given a "good play." This we have attempted to do on this and the following page. We hope you like it.

But who is this "Chaldron Ell Slug?"

Our files disclosed no such individual. The phone book and city directory were of no help. Then a bright editor thought to look in the dictionary—why we'll never know—and there he unmasked "Chaldron's" identity.

That ever-faithful compendium—Webster's Unabridged—which any thinking editor will have displayed prominently in the office, told our bright boy that "Chaldron" is . . .

"A nearly obsolete English dry measure for coal, lime, etc., com-

monly equal to 4 quarters, or 32 bushels, but in London to 36 bushels, and in Newcastle to about double this amount."

Still with us? Then how about "Ell?" That's . . .

"A measure, chiefly of cloth, now little used. It is of different lengths in different countries, the English ell being 45 inches, the old Dutch or Flemish ell about 27, the Scotch ell about 37, the Danish 24.7, the Jersey ell 48."

Now let's get down to the "Slug" part. It says in Webster's that a "slug" is . . .

"The British engineering unit of mass. It is equal in pounds to the number of feet that a freely falling body will accelerate per second at the location in question; thus, if the acceleration of gravity is 32.1 feet per second, the value of the slug is 32.1 pounds."

"Slug" also is defined by Webster as "A dram (of liquor); a draught, or drink."

So what the ell, here's the letter:

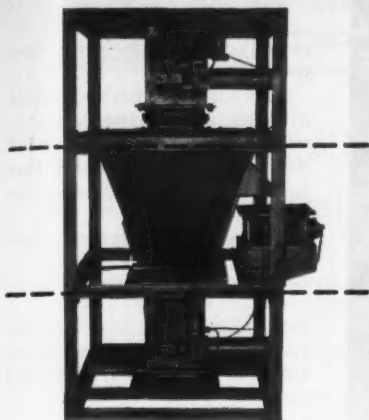
## DEAR EDITOR:

It is amazing to me to note how many technically trained people are completely unaware of the stimulating, and frequently desirable results

which are obtainable from the use of the "Variable Constant System."

For the benefit of those who are aware only of the English

## THE W-C HOPPER SCALE



standardized components  
adapt it to a  
full range of material  
handling methods,  
control instrumentation

Take a good look at this hopper scale. It has many practical features for almost any weighing application.

Take the upper and lower frames. They are designed to accommodate many standardized feed and discharge components: sliding gates, vibratory feeders, screw feeders and others. These units are pre-engineered; their performance has been fully proven in use. Costs are, therefore, correspondingly lower. Satisfactory operation is confirmed in advance.

Now look at the middle or hopper frame. Note the flexure mountings. They give stability to the unit and deliver a single component of force to the weight transmitter regardless of load distribution. The transmitter, itself, may be either electric or pneumatic; the signal can be used for weight indication, recording, automatic batching.

Write for Catalog 12.  
Clear text, lots of pictures.



**WEIGHING and Control COMPONENTS, Inc.**  
206-A Lincoln Ave., Harborside, Pa.

Check 2681 opposite last page

DECEMBER 1958

## LETTERS

and the CGS systems, let me hasten to say that the VCS system does not embrace variable constants, per se, but rather permits the operator to vary the nature of the constants which he utilizes.

This system, aside from forming a great intellectual delight, presents a method whereby the operator can get out from under some engineering BOO-BOO, and make things look good enough to give him time to recalculate all over again.

This system has performed so effectively, that I have seen even the most unlikely engineers and chemists rise to undreamed-of heights in their careers through its use.

For those of the readers who might want to learn more, I suggest they consult the "Units and Conversion Factors" section in one of the handbooks. Extracted here is a brief list of these units which are most commonly used in the VCS system:

Barleycorn	0.84667 cm.
Bu	126 gal
Coomb	4 bu
Noggin	0.03125 gal
Perch	24.75 cu ft
Quintal	112 lb
Seam	8 bu
Sign	30°
Strike	2 bu
Wey	252 lb

This list is not complete, and the expert VCS man can find many more units. In fact, the proficient VCS consultant will manipulate these constants to derive a wide range of numerical values. For example, the density of water is commonly understood to be 1 g/ml in the CGS system, and 62.4 lb/cu ft in the English system. In the VCS system, however, the density of water may be 5.5464 (quintals per seam), or it may become 0.01655 (weys per pottle).

Imagine yourself a development engineer who has just managed to blow a 150-gal pilot reactor sky-high. As the melted phenol comes pattering down through the hole in the roof, you turn nonchalantly to your works manager, saying, "By Golly, chief, my figures were right all the time! I just used clove-moles instead of

## ... a widely miscible non-aqueous solvent, azeotroping agent, Lewis-acid catalyst, intermediate, and flame- retardant additive— METHYL BORATE

Except for its very ready hydrolysis by atmospheric moisture, Methyl Borate,  $B(OCH_3)_3$  is a quite stable compound. It does not decompose thermally below 400°C.

We'd like to discuss with you one or more of these suggested uses of Methyl Borate; as a non-aqueous solvent, as a catalyst in organic synthesis, in azeotropic distillation, as a flame-retardant additive, to prepare substituted boranes, as a catalyst for Diborane reactions, as a neutron absorber and detector, as a stabilizer for sulfur trioxide. Write for Technical Bulletin C-510.

Phone: FOrest 4-1130 TWX: 117 Perryville, Pa.



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**CHEMICAL COMPANY**  
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Center-Guided  
Type for lines  
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Globe Type for  
lines 3" to 24"

This dramatic new office for Connecticut General Life Insurance Co. in Hartford is another major structure that is well-protected against surge pressures and water hammer by Williams-Hager Silent Check Valves.

Write for Bulletins: No. 654 on  
Valves; No. 851 on Cause, Effect  
and Control of Water Hammer

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# WATER WATER WATER WATER WATER

If an adequate supply of water is most important in the location of your plants—let your sights on a plant site in one of the nine midwestern states served by the Chicago and North Western Railway.

Let us give you the facts on the sources of abundant soft, cold and hot water readily on tap in the available sites served by our railroad. Let us show you, too, how, through our systematic investigation procedure, we can anticipate your needs on . . .

Power and Other Utilities  
Labor Supply  
Transportation

Markets  
Community Attitude  
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and the hundred and one other factors that must be considered before you choose a new plant location. Address:

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Director of  
Industrial Development  
C.N.W.R.  
480 W. Madison St.  
Chicago 4, Illinois



Nine great Midwestern States are served by North Western

CHICAGO AND  
NORTH  
WESTERN  
RAILWAY

## LETTERS

pound-moles. How do you like that!"

This sort of remark, dropped at such a dramatic moment, will impress any boss so that he immediately assumes that he has here a man who ought to go places.

Try the VCS system next time YOU make a goof.

CHALDRON ELL SLUG

P.S. If any of your readers have an engineering job open, I'll take it . . . starting right now.

## 'Banbury' not generic

Dear Sir:

We appreciate the publicity given our Banbury mixers in the article entitled "One Man Does Work of Two" on Page 155 of your September issue.

The name "Banbury" is a registered trademark, and we note that you have used it as a generic term. Such use in an isolated instance of this kind is probably not prejudicial to maintenance of the name as a trademark, but we do wish to request that if you have occasion to write about Banbury mixers in the future that you use the full name "Banbury mixers."

If it is appropriate to do so, an indication that the name "Banbury" is a registered trademark of Farrel-Birmingham Company, Inc. would also be appreciated.

T. V. BUSK

Advertising Manager

Farrel-Birmingham Co., Inc.  
Ansonia, Conn.



"Just call me Doctor . . ."



## Watching Washington

### Legislation Due on Control of 4 Agricultural Chemicals

Watch for introduction of legislation in the upcoming Congress to control a quartet of agriculture chemicals — defoliants, desiccants, plant regulators and nematocides, which are not now covered by the Federal Insecticide, Fungicide, and Rodenticide Act.

Spearheading the drive to get a bill through Congress is the National Agriculture Chemicals Association. It's working on a proposed draft of an amendment to the act which would cover regulations on the four chemical types. (See story on pesticides on page 29.)

Right now, these particular chemicals are not covered by other legislation. They would fall under jurisdiction of the new food additives amendment to the Food, Drug, and Cosmetic Act. Indications are that the logical move would be to have all agricultural chemicals regulated under the FIFR Act, which the Department of Agriculture administers.

This proposal, of course, would not alter the Food and Drug Administration's role in regulating agricultural chemicals under the Miller Pesticide Amendment, which pertains to residues on food crops, another aspect of control.

#### Some States Act

What's been happening, too, is that a few states have proceeded with their own legislation to regulate use of these chemicals under at least three different type of laws.

In a speech here, Lea Hitchner, NACA executive secretary, urged the powerful Association of American Pesticide Control Officials to postpone regulatory action at the state level until next year when, it is expected, the Federal law will be the guide.

"Enactment of an amendment to the present act," he told them, would "insure uniform regulation of these products at both the federal and state level."

Hitchner went on to say: "We believe there would be difficulties for both control

officials and industry if states were to adopt one pattern of control over these products while the federal government adopted another. While we are fully conscious of states' rights and the fact there should not be domination in the regulatory field by the federal government, we believe that in this instance the state should not take action until this matter has been resolved and a federal pattern established."

Since the meeting, both the American Pesticide Control Officials Association and the American Fertilizer Control Officials Association passed a resolution endorsing the NACA proposal.

#### No Opinion Yet

While no official opinion is available yet, prospects are that both USDA and FDA will go along with the NACA proposal.

Those chemical processors with an interest in seeing all agricultural chemicals regulated under one federal law should write their Congressmen early in the next session.

Chemical processors in the agricultural chemical business should be interested in two other facets of Hitchner's speech. The NACA's executive secretary took the AAPCO to task on two accounts. On the first it was for refusal of some states to register certain pesticides which comply with technical requirements of the law. While various reasons may be offered to justify this refusal, Hitchner told the group it appears that denial of permission is based funda-

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higher in META content  
by



Pitt-Consol META PARA CRESOL has 2.7 parts of meta to every one of para . . . more meta cresol (over 70%) than most mp cresols on the market today! Offered in 2° and 3° grades of high purity and closely controlled uniformity, this phenolic product is unique . . . shows great promise for new phenolic resin applications.

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Consult our insert  
in Chemical Materials Catalog  
or write for your file copy.

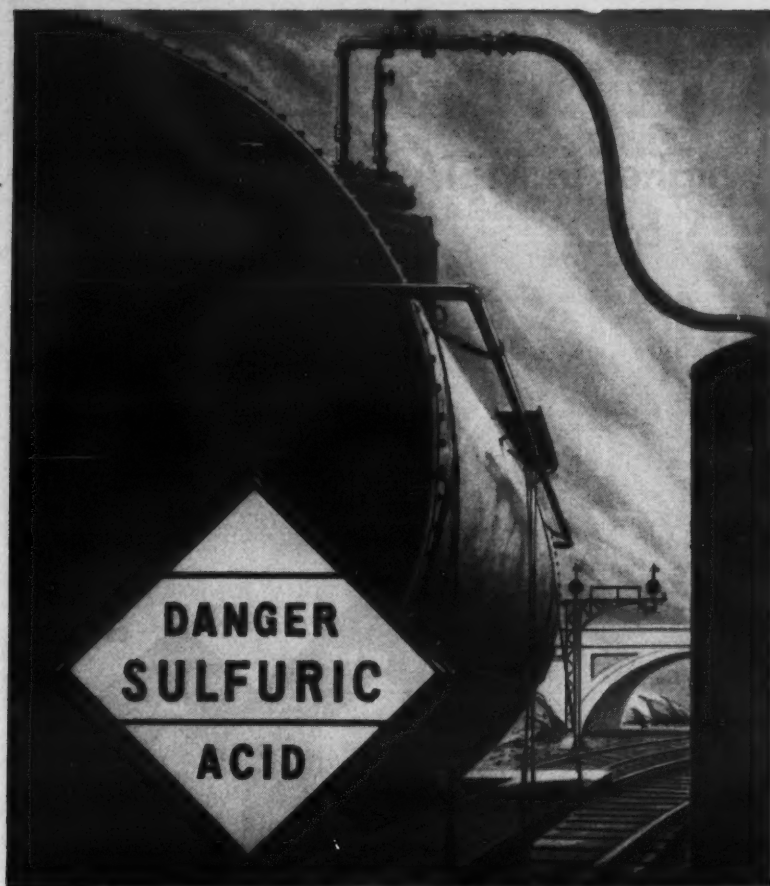
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Transferring concentrated sulfuric acid with Quaker Hypalon Acid Hose.

## CONCENTRATED SULFURIC ACID CAN'T HURT THIS HYPALON HOSE

Neither can nitric, phosphoric, or hydrochloric acids, to name a few. Reason? The inner lining of Quaker Hypalon Acid Hose is made of HYPALON\*, a chlorosulfonated polyethylene synthetic. Hypalon checks acid attack before it can begin. The hose stays soft and supple—easy to handle. You get more mileage for your hose dollar.

### Some of the acids Hypalon will carry

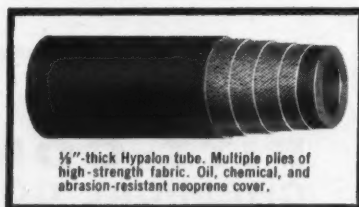
Acid	Max. Temp.	Max. Concentration
Hydrochloric	150° F.	37%
Nitric	R.T.	70%
Phosphoric	120° F.	85%
Sulfuric	R.T.	98%

Hypalon is reinforced with multiple plies of medium-weight duck, frictioned with highest-quality com-

pounds. Rugged Neoprene cover is slow-aging and abrasion resistant.

To learn how Quaker Hypalon Acid Hose can save you more money, call your local Quaker distributor, or write Quaker Rubber Division, H. K. Porter Company, Inc.; Philadelphia 24, Pa., or Pittsburg, Calif.

\*Reg. T.M. E. I. DuPont de Nemours & Co.



3/4"-thick Hypalon tube. Multiple plies of high-strength fabric. Oil, chemical, and abrasion-resistant neoprene cover.

**H. K. PORTER COMPANY, INC.**  
QUAKER RUBBER DIVISION

Check 2686 opposite last page

## WASHINGTON NEWS

mentally on the view of some state personnel that the product or products in question are not needed in the state—or that some other products will do a more effective job of pest control or do it more economically.

"We take strong exception to this practice," Hitchner said. "We feel a state has the duty of accepting for registration any product which is effective and properly labeled. Consideration of economics or comparative effectiveness are beyond the scope of the pesticide laws."

Hitchner also referred to refusal of some states to accept for registration fertilizer-pesticide combination products.

"As long as a product is properly labeled and in compliance with the requirements of both the fertilizer and pesticide laws," he said, "it should be registered and permitted to be sold and used in your state."

NACA doesn't object to these products being registered under both the fertilizer and pesticide laws, Hitchner continued, but added that then the product should be eligible for sale.

### Union Merger Plans in Final Stages

In the works now are final plans for merger of two autonomous AFL-CIO unions, the International Chemical Workers and the Oil, Chemical and Atomic Workers. At the 15th annual convention here, delegates endorsed plans for drafting a constitution next spring. OCAW has already approved this timetable.

Under Secretary of Labor James T. O'Connell told the convention: "This is an example of the type of unifying, strengthening progress that we all envisioned and hoped for when the AFL and CIO joined forces in December 1955. If and when ICWU and OCAW become one, the occasion should mark a great victory for the individual chemical worker."

Elwood D. Swisher, OCAW

## PUMPING MOLTEN CHEMICALS?

write **TABER**

Whatever your pumping needs... why not put it up to Taber... long experienced pump specialists. Vertical pump illustrated, 19,478, for pumping molten chemicals. Horizontal pump, 6043, handles black liquor, caustic, etc., in evaporator service; or transfers fluids under vacuum.

FIG. 19,478

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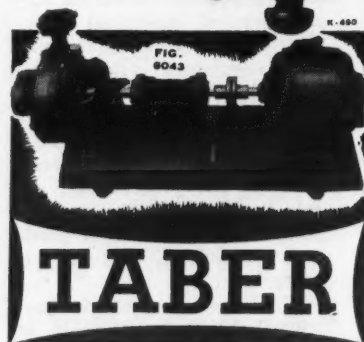


FIG. 6043

**TABER**

Check 2687 opposite last page

CHEMICAL PROCESSING



vice president, praised the co-operative spirit of the two unions, but told delegates that real gains can be made in the chemical industry only when all chemical workers are brought together in an industrial union.

"The multi-million dollar chemical companies," he said, "pay no particular attention to our talk of right and justice. They understand only the degree of strength and power which can be launched against them to support the collective bargaining demands of our unions and the aspirations of our members for better wages and working conditions and greater security."

Industry spokesmen are watching with interest the progress of the merger plans. As yet, no one has commented on Mr. Swisher's remarks.

#### 'Town meetings' set up on industry problems

Chemical and allied industry groups will get a chance to tell the Department of Health, Education and Welfare just what's on their minds at two meetings in Washington this month.

On December 11, chemical, food and related industry groups invited by Secretary Arthur S. Flemming will query HEW-FDA officials — town-meeting-style — on "problems and programs of mutual concern . . . to promote better understanding between the department, industry and consumers."

On December 17, drug and cosmetic industries will be given an opportunity to discuss their problems with HEW-FDA people on topics of general and mutual interest.

Following close upon the two-day industry-FDA forum spearheaded by the Food Law Institute, it would seem that the town meeting has returned to stay for a while. Spokesmen for both industry and government are hopeful of mutually beneficial results.

"Watching Washington" will keep readers informed on issues of interest.

# Any density-any capacity



*Flexmount*



*Coilmount*



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**Flexmount** for light duty service uses leaf springs. These oscillating conveyors are ideal for gentle handling of free-flowing materials in lighter duty applications. They're fabricated in widths of 8, 12, 18 and 24 inches — with 4-in. deep troughs. Available from stock.

**Coilmount** for medium duty service uses coil springs. Designed for moderate applications handling mildly abrasive and bulk materials. Coilmounts are available in 10 and 20-inch widths with 6-inch deep troughs. They are shipped in assembled sections, making installation costs low. Available from stock.

**Toromount** for heavy-duty service uses torsion bar springs. Engineered for severe service where capacities run as high as 500 tons per hour. Toromounts are rugged, dependable . . . require little maintenance. Trough is easily replaced . . . simply remove bolts securing it to channel frame.

One of these 3

**LINK-BELT oscillating conveyors**  
will give low-cost,  
surge-free flow of your material

No one type of oscillating conveyor is good for all types of duty. That's why Link-Belt builds a complete range of oscillating conveyors for all operating conditions and materials.

Only Link-Belt offers three different design units . . . each engineered for a specific type of service. Their design is the simplest in the oscillating conveyor field and each functions as near to NATURAL FREQUENCY as possible to minimize power requirements. And Link-Belt FULL-TIME POSITIVE ACTION controls the load at all times . . . assures continuous, uniform flow of materials regardless of surges.

For the best in light, medium or heavy-duty conveying, call your nearest Link-Belt office. Or for facts on the complete line of Link-Belt oscillating conveyors, write for Book 2744.

**LINK-BELT**

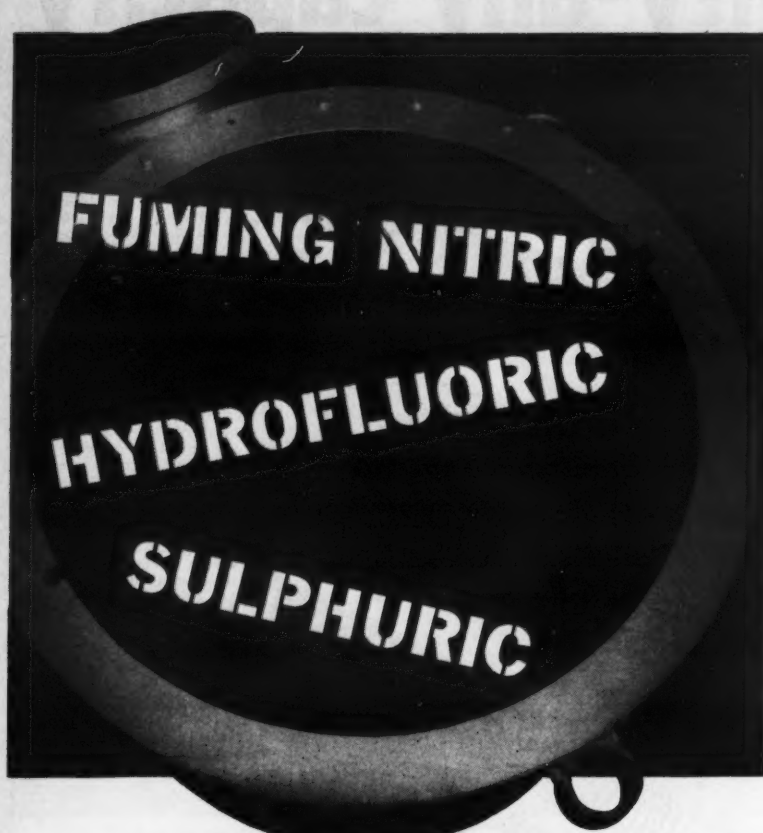
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LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Sales Offices, Stock Carrying Factory Branch Stores and Distributors in All Principal Cities. Export Office, New York 7; Australia, Marrickville (Sydney); Brazil, Sao Paulo; Canada, Scarborough (Toronto 13); South Africa, Springs. Representatives Throughout the World.

14, 1958

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# UP AGAINST THE WORST?



## only CHEMISEAL® Fluorocarbon Plastic LININGS will do

### Certified Applicators:

Atlas Metal Protection, Inc. Houston, Texas  
The Barber-Webb Company, Inc. Los Angeles, Cal.  
Belke Mfg. Co., Inc., Chicago, Ill.  
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Electro-Chemical Engr. & Mfg. Co. Emmaus, Pa.  
Metalweld, Inc., Philadelphia, Pa.

Chemiseal Linings are impervious to all the most difficult acids, alkalies and other highly corrosive chemicals. They permit you to handle such chemicals with ordinary plant equipment.

In addition, they withstand temperatures from  $-320^{\circ}$  F. to  $+250^{\circ}$  F. Have high impact strength. Are tough—not brittle. Are readily cemented over any contour and to any material of equipment construction. Seams are heat-sealed into a continuous, chemically-inert surface.

Chemiseal Fluorocarbon Plastic Linings are available through certified applicators (listed at left), who are trained and equipped to insure best results.

Write for Bulletin AD-152.

Special Products Department  
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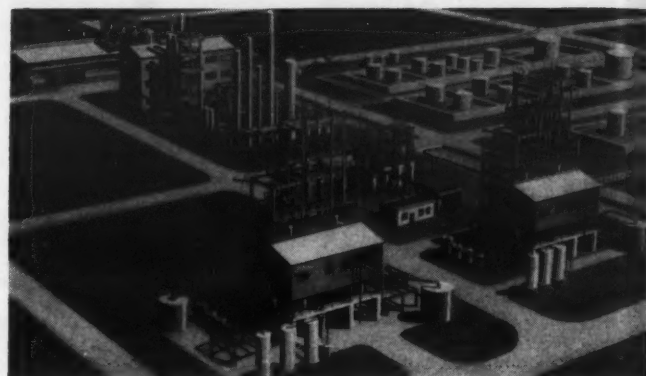
**United States Gasket**

Plastics Division of  
**GARLOCK**



Check 2689 opposite last page

**CHEMICAL BUSINESS** / Our Growing Industry



Architect's sketch of Air Reduction Chemical Co.'s new polyvinyl alcohol resin plant Calvert City, Ky.

## Airco Building \$12-million PVA-resin Facilities

Air Reduction Chemical Co., a division of Air Reduction Co., Inc., has launched a \$12-million construction program for erection of a polyvinyl alcohol resin plant at Calvert City, Ky., and supporting pilot plant at Bound Brook, N. J. Construction already is under way, with both plants expected to be in operation by early 1960.

The resin plant, with annual capacity of 20 million lb, is being built by Lummus Company of New York.

Manufacturing process was obtained under license from Kurashiki Rayon Company, Ltd., Osaka, Japan. Major use for the resin in that country is in production of synthetic fiber known as Vinyon.

Air Reduction also has been granted rights in U.S. to Kurashiki's Vinyon fiber process. Facilities for fiber production still are in planning stages.

Celanese Corporation of America plans to double capacity of acetic acid plant in Pampa, Texas, with work on multi-million-dollar expansion program scheduled to begin this year. Target date for completion is late 1959.

Expanded facilities will enable Pampa plant to produce 240 million lb annually, or 15 percent of nation's requirements for acetic acid. Combined capacities of Pampa and Bishop, Texas, plants will give Celanese more than one-quar-

ter of nation's acetic acid capacity.

The additional acetic acid will be available for increasing production of trimethylolpropane — used in manufacture of polyurethane foamed plastics, coatings and synthetic lubricants—and acrylate esters, whose principal uses are in manufacture of paints and coatings.

Union Carbide Chemicals Company, Division of Union Carbide Corporation, plans two units at Seadrift, Texas, to produce esters and alcohols. Combined capacity will exceed 100 million lb. Units are expected to be completed in 1960.

Plant additions represent expansion in capacity for manufacture of esters and alcohols now produced at other plant locations. They also represent broadening of product line from Seadrift plant which previously manufactured only ethylene oxide, glycols, and polyethylene.

Continental Oil Company has announced development of process for manufacturing straight-chain primary alco-



holds from petroleum. Chemicals will be marketed under trade name of "Alfol."

Plans are being made to install commercial-scale plant of multi-million-lb capacity to manufacture Alfols. Facility is being designed on processing know-how developed by company's scientists and engineers during last five years, and is based on earlier work done by Dr. Karl Ziegler.

Conoco said Alfols can be used in manufacture of synthetic detergents, lubricating oil additives, plasticizers, cosmetics, emulsifiers, and paper and textile chemicals.

Foster Grant Co., Inc., has undertaken developmental production of Fosta nylon film at its Manchester, N. H., plant.

Film is being offered on development scale as part of company's program to establish new fields for this product. Film currently is available in thicknesses of 1.5 mils to 20 mils and in widths up to 36 inches.

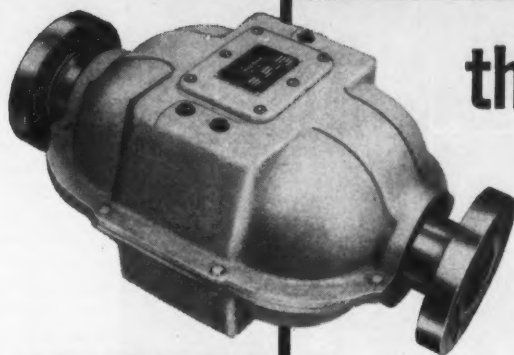
Fosta nylon properties include resistance to oils and organic solvents, even at high temperatures, thus permitting heat sealing and opening up potential new market opportunities in packaging field.

Cumberland Chemical Corporation has been formed by Air Reduction Co., Inc., and The Mastic Tile Corporation of America to produce materials for use by Mastic Tile in manufacturing floor coverings and other building construction products.

A plant estimated to cost \$10 million will be constructed and operated by CCC at Calvert City, Ky., to produce vinyl chloride monomer, vinyl chloride polymer and substantial quantities of a new type plasticizer. Blaw-Knox Company is handling construction, with plant completion expected by early 1960.

Air Reduction, which holds a majority of stock interest, will supply acetylene, one of major raw materials, to plant.

Linde Company, Division of Union Carbide Corporation, has broken ground for multi-million-dollar liquid oxygen and nitrogen plant at Pittsburgh, Calif. Eichleay Corpo-



now  
handling  
all  
these  
difficult  
liquids

the meter with  
**NO** flow  
restrictions

Foxboro's first Magnetic Flow Meter went "on stream" in 1954. Today, this new-type meter has gained industry-wide application for precise, continuous measurement of difficult process liquids.

The Magnetic Flow Meter is installed as simply as a length of pipe. It connects by standard electric cable to remote Foxboro Dynalog\* Electronic Recorder. No seals, purges, meter runs, or straightening vanes are required. Over-all accuracy of the system is  $\pm 1\%$ . And the meter even measures reversing flows.

With easy-to-measure liquids, or with tough ones like those listed below, the performance-proved Foxboro Magnetic Flow Meter provides flow measurement with no line restrictions. For complete details, write today for Bulletin 20-14C. The Foxboro Company, 8112 Norfolk St., Foxboro, Mass.

Reg. U.S. Pat. Off.

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ammonium nitrate solution  
phosphate slurry  
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starch solution

rubber copolymer  
liquid latex  
soda ash  
sulphuric acid  
70% sodium hydroxide  
soap flow  
styrol  
magnesium hydrate

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beer  
grape juice  
apple juice  
pineapple juice  
tomato juice  
milk  
starch slurry  
sugar syrup  
coffee slurry  
molasses

aluminate liquor  
uranium ore slurry  
thickener mud  
cement slurry  
flue dust slurry  
acid wastes

#### OIL INDUSTRIES

drilling mud  
phosphoric acid  
ethanol extract  
scrubber recycle water  
urea solution  
nitrate solution  
spent acid  
sodium silicate & water  
sodium chloride brine  
tar-sand slurry

#### METALS AND MINING

pickling acid  
sand slurry  
ferrous chloride  
limestone shale slurry  
bauxite slurry  
gilsonite slurry

#### PULP & PAPER

all types of pulp stock  
cooking liquors  
spent liquors  
bleaching chemicals  
lime mud slurries  
sizes  
alum  
dyes

#### WATER & SEWAGE

activated sludge  
fresh water  
raw sewage  
digested sludge  
primary sludge  
return activated sludge

METER SIZES RANGE FROM 1/10 INCH TO OVER 6 FEET PIPE DIAMETER

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REG. U.S. PAT. OFF.

**MAGNETIC  
FLOW  
METERS**

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as  
only  
a  
stainless  
steel  
drum  
can  
be

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If you process or store products that require absolute sanitation, you'll be interested in how Eli Lilly and Company, Indianapolis, Indiana—one of the world's leading producers of pharmaceuticals—uses Inland stainless steel shipping drums.

Lilly puts Inland all-welded stainless steel shipping drums through a rigid, high-pressure sterilizing process, and then fills them with antibiotics and seals them. Once sealed, the drums are depended upon to keep their precious cargo "Operating Room" sterile—in shipment and in storage.

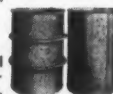
To provide extra protection for your product's quality, during processing or shipping, it will pay you to check the many advantages of Inland Process and Shipping drums. They are manufactured from several types of stainless steel, in many sizes. Process drums: 30 or 55 gallon capacity. Shipping drums: sizes from 15 to 60 gallons, with all modifications necessary to meet ICC specifications 5 and 5C. Whether you need 1 or a carload—Inland can supply the right stainless drum for your requirements. For a free booklet on "The Use and Care of Stainless Steel Drums," ask your Inland representative or write:

## INLAND STEEL CONTAINER COMPANY

Member of the  Steel Family

6532 S. Menard Ave., Chicago 38, Ill.  
Plants: Chicago • Jersey City  
New Orleans • Cleveland and  
Greenville, Ohio

Full line of steel and stainless steel  
shipping containers, including gal-  
vanized and heavy duty ICC drums.



(case history—Eli Lilly Company)

Check 2691 opposite last page

## CHEMICAL BUSINESS

ration, Santa Clara, Calif., will build first phase of project.

Covering 32 acres, plant will be largest of kind in West and among biggest in U.S.

Scheduled for completion in early 1960, plant will produce 300 tons daily of liquid oxygen and nitrogen, and will supply nine-state area. First section will go into operation June 1, 1959, with capacity of 115 million cf/month. When additional equipment goes on stream October 1, 1959, plant will produce more than 220 million cf/month.

Linde Company also will build and operate 130 t/d oxygen plant for Middletown, Ohio, Works of Armco Steel Corporation on property leased from Armco.

Entire output will be high-purity gas, which will be piped throughout Middletown Works. Large portion of volume will be used for enrichment of open-hearth furnace air, with balance going to other general mill requirements.

**Stauffer Chemical Company** is building first plant to produce selective herbicide, Eptam®, on commercial scale at Richmond, Calif. It is expected multi-million-lb facility will be on stream next month. Product is ethyl di-n-propylthiolcarbamate.

**Borden Chemical Company** has placed in operation facilities at its Illiopolis, Illinois, plant for production of polyvinyl acetate beads whereby modern polymerization and drying equipment assures closely controlled viscosity and a free-flowing solid resin bead.

Expansion of Illinois facilities was necessitated, Borden's said, because of increasing demand for PVAc bead by manufacturers of hot-melt adhesives, printing inks, decorative coatings, lacquers, and can-lining formulations. Shipments are being made in 50-lb bags to carload lots.

**E. I. du Pont de Nemours and Company** has announced plans for construction of a laboratory and pilot plant at which the polyethylene film field will be investigated. Facilities will be built adjacent to company polychemicals de-

# GREENS

- 4** Pure Chromium Oxides  
and  
**2** Hydrated Chromium Oxides

Most stable of the green pigments. Unaffected by acids, alkalis, vehicles, and solvents. Non-fading.

The 4 pure chromium oxides will withstand ceramic temperatures. Use them in applications requiring permanency—enamels, emulsion paints, rubber, plastics, floor coverings, roofing granules, building materials, etc.

Use the 2 hydrated chromium oxides for obtaining brilliant color and transparency in automotive finishes, high grade enamels and lacquers.

Your nearest Williams representative will be glad to provide you with full technical data and samples, or write Dept. 75, C. K. Williams & Co., Easton, Penna.

**WILLIAMS**  
COLORS & PIGMENTS

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EMERYVILLE, CAL.

Check 2692 opposite last page

DECEMBER 1958

partment's main polyethylene resin plant, the Sabine River Works at Orange, Texas, and are expected to be ready for operation latter part of 1959.

Commercial manufacture of polyethylene films by Du Pont's film department is expected to result from the investigation. Evaluation of resins, development of film manufacturing techniques, and production of film for market development will be handled in new facilities by film department technical section which will be established at Sabine River Works.

Pennsalt Chemicals Corporation has placed on stream at its Portland, Ore., Works a new plant for production of ammonium perchlorate as part of a \$55-million expansion and improvement program.

Construction of facility was begun in February. It is located adjacent to company's sodium chlorate plant, which was considerably enlarged in last year to supply raw material to recently completed unit.

The Dow Chemical Company has placed into operation at Midland, Mich., a \$500,000 semi-commercial plant designed to assist customers who need speedy production help on special organic chemicals.

Facility is designed to meet needs of manufacturer who, with critical timing, requires representative commercial-quality material for initial field test or marketing program.

A Dow spokesman described plant as versatile collection of unit process equipment capable of rapid conversion to handle wide range of products and processes. Included in products are pharmaceutical and food chemicals, aromatic and cosmetic raw materials.

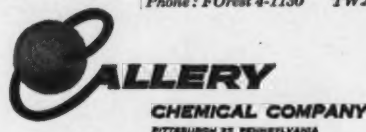


## ... a mildly alkaline solid; intermediate, catalyst, corrosion inhibitor— SODIUM METHYL CARBONATE

Sodium Methyl Carbonate,  $\text{CH}_3\text{OCOONa}$ , is practically insoluble in many organic liquids, but is remarkably soluble in ethylene glycol and in glycerine. A relatively unknown and unexplored compound, it has an unusual combination of organic and inorganic properties.

Applications research on Sodium Methyl Carbonate continues at our laboratories. Some present and potential uses are: as an intermediate for preparing salicylates, ethylene carbonate, and benzyl carbonates; to neutralize weak acids; as a carbon dioxide source; to catalyze the alcoholysis of polyvinyl esters and glycerides; and to inhibit corrosion of anti-freeze cans. Write for Technical Bulletin C-910.

Phone: FOrest 4-1130 TWX: 117 Perrysville, Pa.



Check 2693 opposite last page

**JELLIFF**

Wire Mesh

YOU can profit by our 78 years of experience in weaving wire.  
YOUR specs, your delivery date, on mesh from  $1\frac{1}{4}$ " to 200 x 200  
— plus a complete line of precise filter weaves.

For information, address Dept. 27



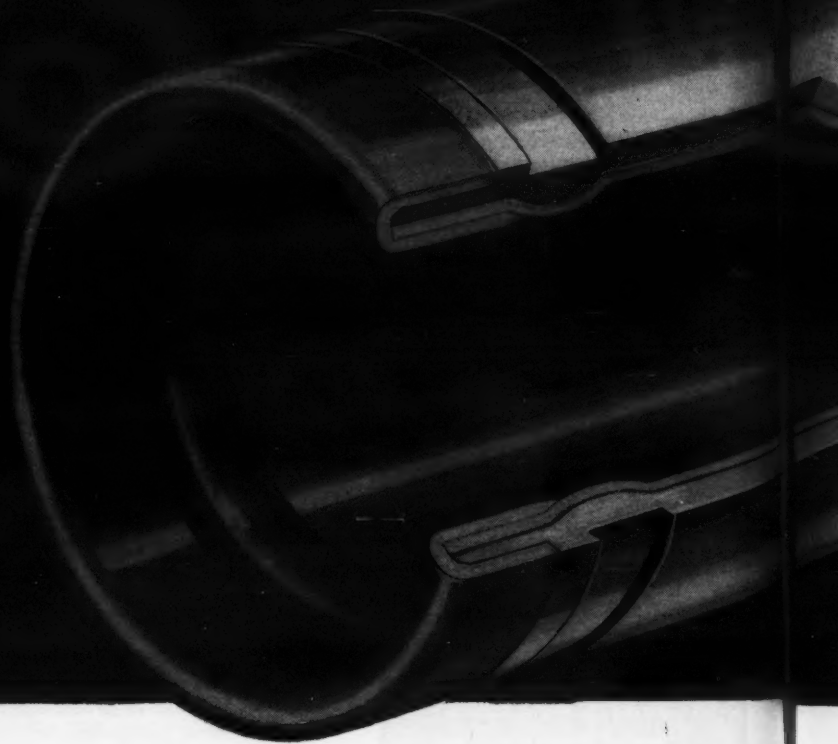
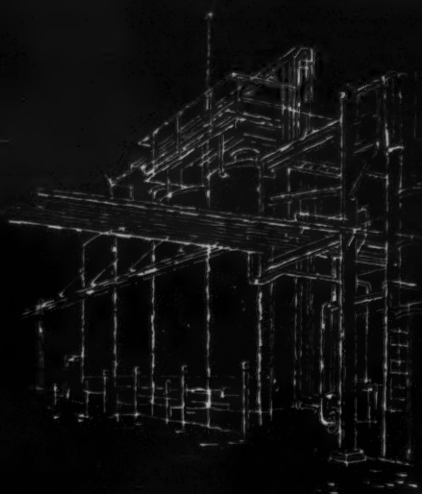
**THE C. O. JELLIFF**  
MANUFACTURING CORPORATION  
SOUTHPORT • CONNECTICUT

Check 2694 opposite last page

# NEW "JAL"

handles corrosive liquids

- at pressures to 1000 P.S.I.
- at temperatures to 150°F.



New "Jal-Jacket" pipe, combining the corrosion resistance of rigid polyvinyl chloride with the strength of steel, offers you these cost-cutting advantages in handling corrosive liquids.

**LOW INITIAL COST.** "Jal-Jacket" pipe costs less than other lined metal pipe.

**LOW COST INSTALLATION AND MAINTENANCE.** Ends grooved for Victaulic couplings permit

quick, easy make-up. Entire systems can be dismantled and re-assembled without damage to the PVC lining. "Jal-Jacket" can be cut to length and joined on the job. Requires no troughs or other costly supporting devices.

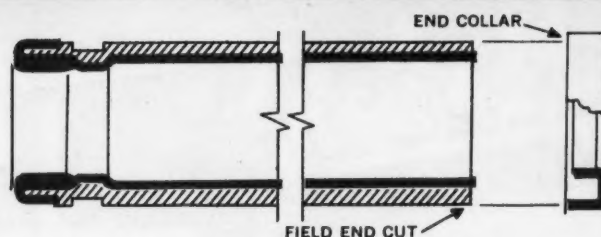
**LONGER SERVICE LIFE.** Plastic liner is bonded securely to the steel jacket. The ends are fully protected with plastic providing continuous protection from chemical attack. Steel jacket assures a tough, rugged product.

## Jones & Laughlin Steel Corporation

PITTSBURGH, PENNSYLVANIA



# JACKET" PIPE\*



\*a rigid unplasticized polyvinyl chloride tube jacketed with electric-resistance welded steel pipe.

"Jal-Jacket" is currently available in 20 foot mill lengths in three sizes, 2 $\frac{3}{8}$ "", 3 $\frac{1}{2}$ "", 4 $\frac{1}{2}$ " O.D. Get complete details by mailing this coupon today.

## Jones & Laughlin Steel Corporation

3 Gateway Center, Pittsburgh 30, Pa.

- ☐ Send information on "Jal-Jacket"  
☐ Have J&L representative call

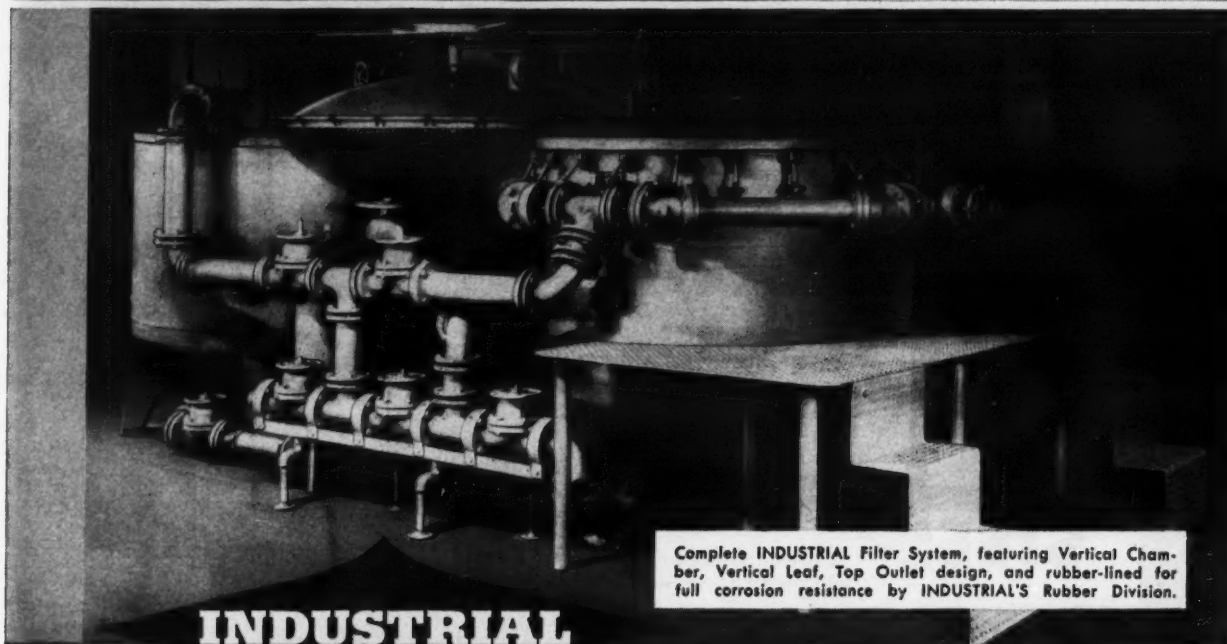
Name \_\_\_\_\_  
 Title \_\_\_\_\_  
 Company \_\_\_\_\_  
 Street \_\_\_\_\_  
 City \_\_\_\_\_ State \_\_\_\_\_

For more information on product at right, specify 2695 see information request blank opposite last page.





INDUSTRIAL Horizontal Filter with Horizontal Chamber, Vertical Leaf, Bottom Outlet, Quick-Opening Cover, and Pneumatic Leaf Assembly Extractor.



Complete INDUSTRIAL Filter System, featuring Vertical Chamber, Vertical Leaf, Top Outlet design, and rubber-lined for full corrosion resistance by INDUSTRIAL'S Rubber Division.

**INDUSTRIAL**

## Engineered Filtration Equipment and Techniques to improve product quality—cut processing costs


Your process is different in some ways from any other. That's why—for highest product quality, operating simplicity, and economy—you need a filtration system built specifically for you. An INDUSTRIAL engineered system is exactly that.

INDUSTRIAL is more than a builder of filtration equipment—it's a specialized engineering service that makes available to you over 25 years of filtration experience and techniques. Our engineers and chemists will work with you to develop a system which takes into consideration all the factors vital to your specific operation—type of slurry, filter design, cake recovery, cleaning, piping, auxiliary apparatus, and controls. At

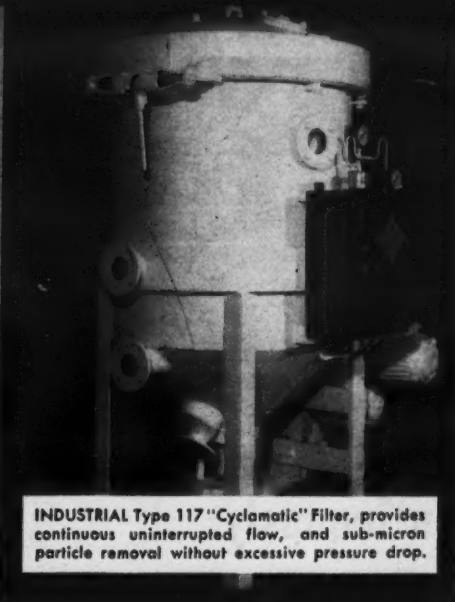
INDUSTRIAL'S Testing Center, there are complete facilities for pilot plant study of any system, ready to be put to work for you.

Remember, too, that INDUSTRIAL produces a full range of filter types and sizes—and can therefore recommend, without partiality, a filter most suitable for your needs. A wide variety of cost-saving optional features are also available. And all systems are adaptable to full or partial automation.

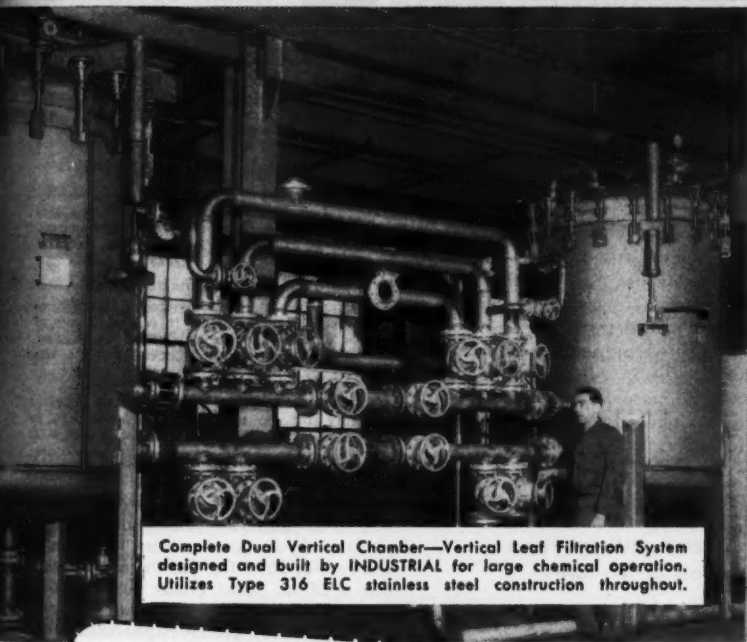
Call or write INDUSTRIAL to find out how properly-engineered filtration equipment and techniques can improve product quality and cut processing costs.



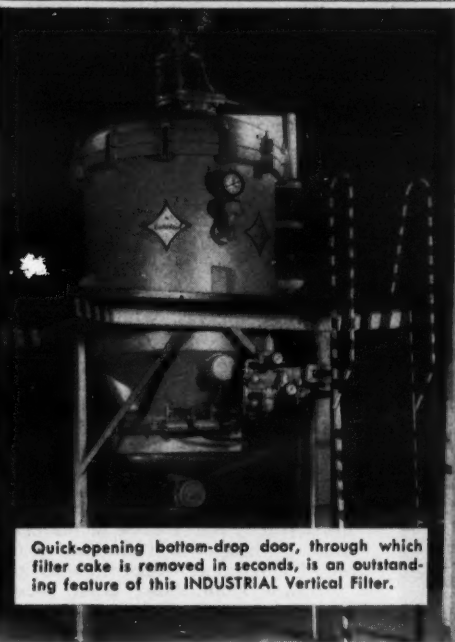
INDUSTRIAL Type III Vertical Filter in petrochemical service. Features Vertical Chamber, with Vertical Leaves and Bottom Outlet.



INDUSTRIAL Type 117 "Cyclomatic" Filter, provides continuous uninterrupted flow, and sub-micron particle removal without excessive pressure drop.

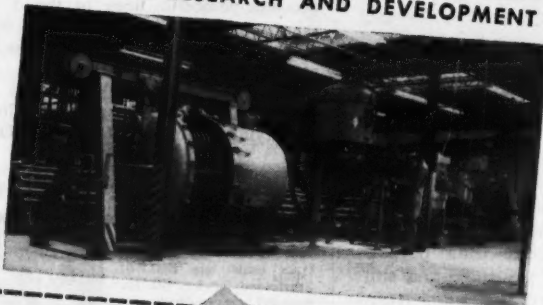


Complete Dual Vertical Chamber—Vertical Leaf Filtration System designed and built by INDUSTRIAL for large chemical operation. Utilizes Type 316 ELC stainless steel construction throughout.



Quick-opening bottom-drop door, through which filter cake is removed in seconds, is an outstanding feature of this INDUSTRIAL Vertical Filter.

#### RESEARCH AND DEVELOPMENT TESTING CENTER



Here, your process conditions can be duplicated and studied—to help you select the most suitable filtration system, without disturbing your production. This Center includes all types of pressure filters and auxiliary equipment—all interconnected by an ingenious valve and piping system. Comparative data on variations is obtained in minutes, instead of days of costly experimentation in your own plant.

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Write today for descriptive literature and recommendations on INDUSTRIAL equipment to meet your specific requirements.

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**INDUSTRIAL FILTER & PUMP MFG. CO.**

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PRESSURE FILTERS ♦ ION EXCHANGE EQUIPMENT ♦ WASTE-TREATING EQUIPMENT





## at Shell Chemical TELSTOR® Continuously Monitors the Process



Operable in liquids, granular solids, viscous fluids, powder and similar media, the Telstor System consists of a bridge measuring circuit and remote meter indicator, calibrated to read the level or quantity of material in the vessel. The bridge circuit supplies a low value of d.c. current which also can be fed to a suitable recorder such as the Robertshaw Series 42 Concentric Scale Indicator. Write for Telstor and Series 42 Technical Bulletins.

Copolymerization of synthetic rubber's basic ingredients—butadiene and styrene, requires stable, reliable measurement, indication and control. A Telstor Continuous Level Indication System, developed by Robertshaw, monitors flash tanks in these critical blending areas at Shell Chemical Corporation's giant Torrance, Calif. latex plant. Nearby, Robertshaw Series 42 instrumentation provides panel indication, recordation and control.

Endlessly, everywhere in the process industry, trouble-free Robertshaw Capacitance Measurement and Control Systems are contributing toward reduction of operating expenses and increased product quality. Write for "Capacitance Level Measurement and Control Systems", a new, 8-page, illustrated discussion of this important subject.

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AERONAUTICAL AND INSTRUMENT DIVISION

**Robertshaw-Fulton**

CONTROLS COMPANY

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Check 2697 opposite last page



### nuclear notes

Significant news about  
atomic energy



#### New atom lab

Allis-Chalmers' Nuclear Power Division has started operations in their new laboratory. Located on a 30-acre site in suburban Greendale, Wisconsin, the installation consists of two buildings occupying a total floor space of about 23,000 square feet.

#### Test irradiation services proposals invited

AEC has invited industry, research, and educational institutions to submit proposals for performing test irradiation services for the Commission. Reactor materials and components would thus be subjected to an environment comparable to conditions in reactors for which materials and components are intended. Deadline for submission of proposals is January 12, 1959.

#### Special skills needed for all in A-plants

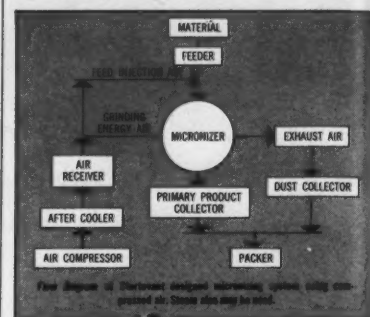
Successful carrying out of assignments in nuclear power plants requires a great deal of knowledge and skills not needed in conventional power plants, says E. L. Armstrong, training specialist for General Electric.

Armstrong pointed out that every person must be acquainted with personal protection measures. Technical men must have more specialized knowledge than personnel in other positions and thus require more thorough training.

"At this time," he stated, "there are relatively few men who are technically familiar with reactor plants and who also have had operating experience."

## Need ½ to 44 Microns?

Sturtevant Micronizers\*  
Make 325 Mesh Obsolete



#### One Operation Reduces, Classifies

Sturtevant Micronizers grind and classify in one operation in a single chamber—provide fines in range from ½ to 44 microns to meet today's increased product fineness needs. Can handle heat-sensitive materials.

Production Model  
(15 in. chamber)

#### No Attritional Heat

Particles in high speed rotation, propelled by compressed air entering shallow chamber at angles to periphery, grind each other by violent impact. Design gives instant accessibility, easy cleaning. No moving parts.

#### Classifying is Simultaneous

Centrifugal force keeps oversize material in grinding zone, cyclone action in central section of chamber classifies and collects fines for bagging. Rate of feed and pressure control particle size.

#### Eight Models Available

Grinding chambers range from 2 in. diameter laboratory size (¼ to 1 lb. per hr. capacity) to large 7' in. diameter production size (500 to 4000 lbs. per hr. capacity). For full description, request Bulletin No. 091.

#### Engineered for Special Needs

A 30 in. Sturtevant Micronizer is reducing titanium dioxide to under 1 micron at feed rate of 2250 lbs. per hr. For another firm, a 24 in. model grinds 50% DDT to 3.5 average microns at a solid feed rate of 1200-1400 lbs. per hr. A pharmaceutical house uses an 8 in. model to produce procaine-penicillin fines in the 5 to 20 micron range. Iron oxide pigment is being reduced by a 30 in. Micronizer to 2 to 3 average microns.

Sturtevant will help you plan a Fluid-Jet system for your ultra-fine grinding and classifying requirements. Write today.

#### Can Test or Contract Micronizing Help You?

Test micronizing of your own material, or production micronizing on contract basis, are part of Sturtevant service. See for yourself the improvement ultra-fine grinding can contribute to your product. Write for full details. STURTEVANT MILL CO., 119 Clayton St., Boston, Mass.



\*REGISTERED TRADEMARK OF STURTEVANT MILL CO.

Check 2699 opposite last page

CHEMICAL PROCESSING

**Highly enriched U-238  
offered by AEC**

Uranium enriched to more than 99.97% in the uranium-238 isotope is now available from AEC. Material is being sold in the following forms: as  $U_3O_8$ ,  $\frac{1}{8}$ " diameter cast rod and metal foil. Costs per gram of uranium are: \$15.25, \$16.50, and \$16.75 respectively. Prices do not include transportation or standard handling charge of \$14.00 per shipment.

**Radioactive standards  
commercially available**

Eight longer-lived radioactive isotope standards, previously supplied by the National Bureau of Standards, are now being offered commercially. The standards have half-lives varying from 46 days to 33 years. They include cesium-137, cobalt-60, radium D+E, iron-59, strontium-90, sulfur-35, tantalum-182, and thallium-204.

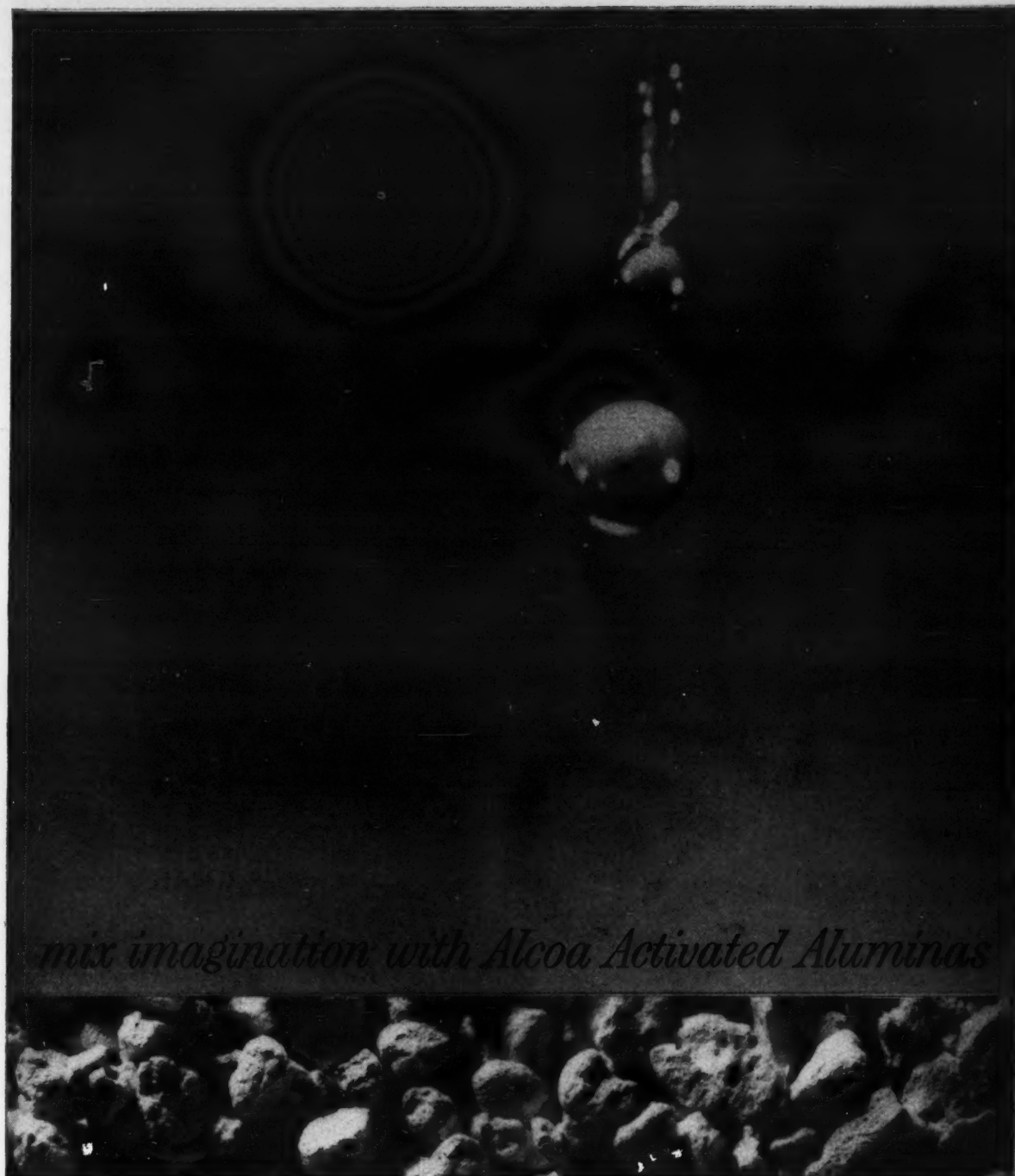
All are solution standards, except the radium D+E which is in plated form. Solution standards cost \$25.00 each. The radium D+E sources cost \$40.00 each.

(Radioactive standards are product of Nuclear-Chicago Corporation, 229 West Erie Street, Chicago 10, Illinois.)

Check 2698 opposite last page.

**Uranium production  
statistics released**

Figures released by AEC on domestic uranium production for the first six months of 1958, show that estimated ore reserves total 78.5 million tons. Ore receipts at all private plants and Government purchase depots totalled 2,440,000 dry short tons. Ore fed to process amounted to 2,471,000 tons, with an average grade of 0.26 percent  $U_3O_8$ . Ore stockpiled as of June 30 totalled 1,956,531 dry tons, and a total of \$1,026,724 was paid in initial production bonus in the first six months of 1958. As of June 30, there were 18 uranium processing mills in operation.



*mix imagination with Alcoa Activated Aluminas*

to remove the last drop of unwanted product or process water. Is unwanted water undermining your product quality . . . or ruining the efficiency of your process? If so, try this sure solution to your dehydration problems: mix imagination and engineering with Alcoa® Activated Alumina. You can count on this old reliable among commercial desiccants to achieve the lowest dew points you require. It can never soften, swell or disintegrate. It is nontoxic, noncorrosive and practically iron-free. It can be saturated and reactivated through almost endless cycles—to keep drying costs low. Put the proved effectiveness of Alcoa Activated Alumina to work in solving your dehydration problems. Drying machines charged with Alcoa Activated Aluminas are available from a number of manufacturers. For their names, or for product information, contact your local Alcoa sales office. Or write ALUMINUM COMPANY OF AMERICA, CHEMICALS DIVISION, 705-M Alcoa Building, Pittsburgh 19, Pa.

For finer products . . . let Alcoa add new dimension to your creative thinking!



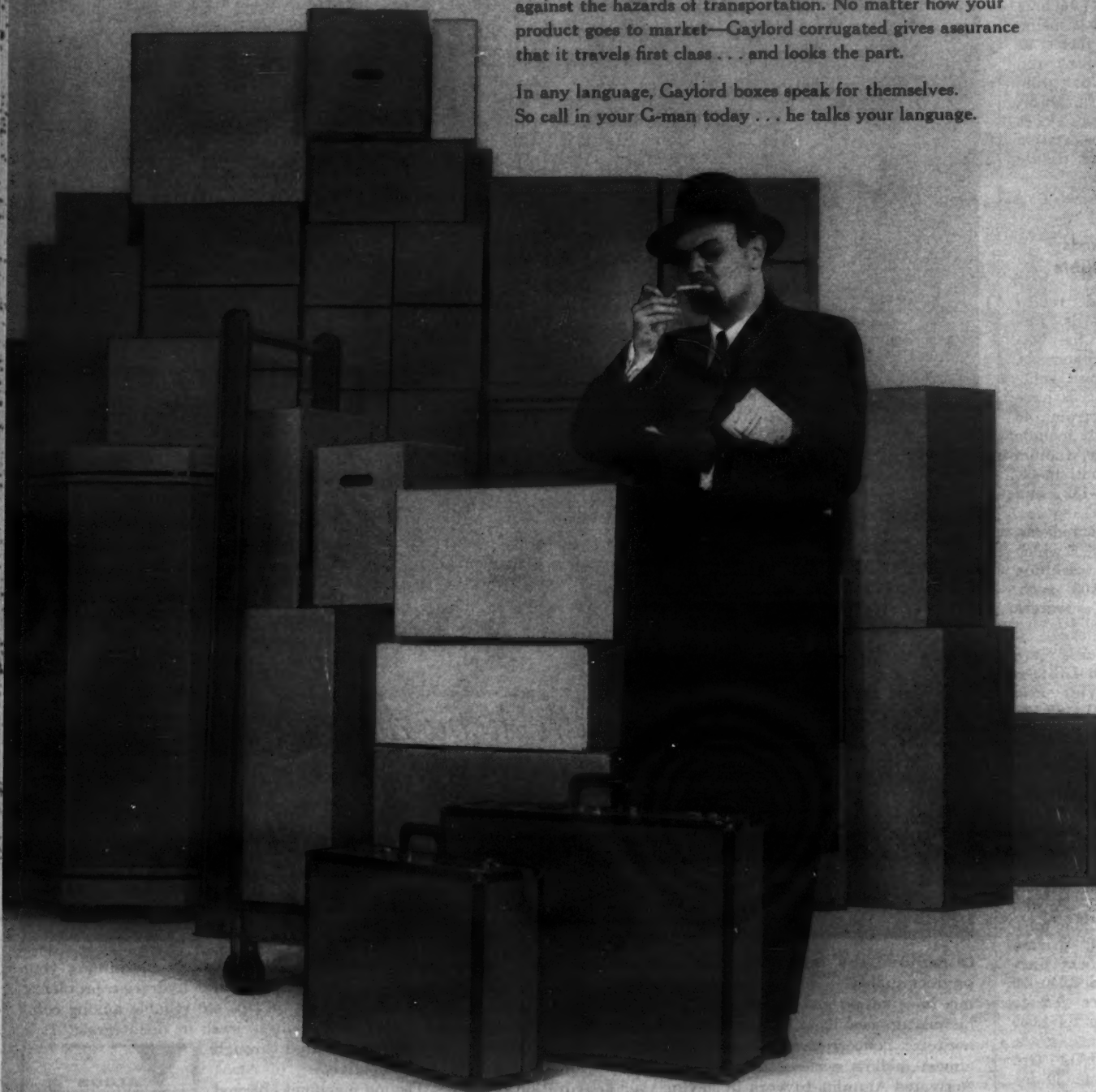
ALCOA THEATRE  
Fine Entertainment  
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Corrugated boxes by Gaylord deliver positive protection against the hazards of transportation. No matter how your product goes to market—Gaylord corrugated gives assurance that it travels first class . . . and looks the part.

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PLANTS COAST TO COAST

DIVISION OF **Crown Zellerbach Corporation**



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**DR. RALPH LANDAU**, Executive Vice President,  
and **THOMAS P. BROWN**, Senior Vice President,  
Scientific Design Company, Inc.

## EXPANSION by acquiring FOREIGN KNOW-HOW

There are numberless instances of the purchase of licenses to practice inventions under patents in the chemical process field. Much less common is the acquisition of know-how. A patent disclosure is carefully worded to substantiate the broadest possible claims for the inventor, while at the same time divulging somewhat less about how to practice the invention.

Indeed, a patent application is usually filed when the invention is in its infancy and has been reduced to practice only in the most rudimentary fashion. A patent license is little more than a hunting license to acquire practical operating knowledge for an invention's commercial practice.

Know-how embraces operating data, based on actual experience in the practice of a chemical process. Obviously, know-how will vary widely in its comprehensiveness. It can include only the data accumulated in small bench experimentation, or it may derive

from more extensive operating experience gained from a pilot plant or semi-works unit. It is most valuable, and most expensive to acquire, when it comprises not only the fundamental chemistry of the process but engineering design and operating data based on a successfully operating commercial plant.

### Two Reasons to Buy

Know-how is purchased from outside sources by a manufacturing company for two prime reasons:

1. To save money, since the purchase price is almost always less than the original cost of research, development and operating trials upon which it is based.

2. To gain an advantage in time, and to establish a sound commercial position in the field before potential profits are watered down by widespread competition.

The first and most obvious source of know-how from a foreign country is a manufacturing company which is in commercial operation on the process or product which is of immediate interest. A company in Europe today will pay much less than its American counterpart for research and development to bring a new chemical process into being. Research and development expense is first an investment in terms of technically-trained manpower. Since the price tag on know-how is at least partly based upon its cost of development, the chance of acquiring know-how at an attractive price is enhanced when it is obtained abroad.

Availability of low-cost skilled scientists, coupled with the spending of up to 5 percent of sales for research, means that foreign companies may be able to devote a far greater number of man hours to research and development than U.S. companies find possible, and thereby greatly increase the chance that useful technology can be purchased abroad.

Another possible advantage stems from the fact that com-

panies abroad are becoming increasingly interested in capital investments in the U.S. as their own internal markets approach saturation. A number of major European chemical companies would be willing to supply a portion of the capital for a new venture in the U.S., or accept a part equity in the venture in exchange for know-how.

### Some Problems

But all is not rosy in seeking know-how directly from foreign companies. There are certain specific problems and handicaps which must be overcome before a deal can be consummated and a plant project initiated in this country.

First, there is the obvious barrier of different languages. Because of the relative self-sufficiency of our country, Americans by tradition are monolingual. This constitutes a very real obstacle to achieving a mutual understanding in the delicate business of negotiating for purchase of precious know-how, and digesting it after the purchase is consummated.

*To next page*

## EXPANSION THROUGH KNOW-HOW

*From preceding page*

It has been said that secrecy regarding know-how in the chemical industry is almost pathological in degree. This characteristic is, if anything, more acute on the foreign than on the American scene. This makes it quite difficult, in the absence of excessively restrictive confidentiality agreements, to obtain from many foreign manufacturing companies the minimum data on the process which is required for its preliminary economic evaluation. Yet certainly this is a necessary step along the way to a decision to purchase know-how.

### Difference in Economies

A more serious difficulty in adapting a foreign manufacturing technique to U.S. conditions is caused by the great difference between the national economies of the U.S. and other Free World countries. Almost without exception, a plant in this country will be considerably larger than its foreign prototype, and economic considerations will dictate continuous operation with a high degree of automation, which cannot be said to be typical of foreign chemical plants.

These design factors may require radical changes in technology, with resultant de-

lay and cost for further process development work. The foreign operating company technical staff is often very unfamiliar with American practice, and the burden of adaptation ultimately falls heavily on the American purchaser. In consequence, if engineering design on an operating plant is included in the know-how package, its claimed value must frequently be discounted because foreign engineering standards and design bases are not directly applicable to U.S. conditions. Considerable engineering skill and experience in translation and adaption of plants and processes from abroad to this country are necessary to avoid costly delays in execution of the project and excessively high costs in bringing the plant successfully onstream.

Another obstacle is the frequent confusion caused by conflicting claims of different potential sources in foreign countries. How is the prospective U.S. manufacturer to know which process offered to him is really well developed, and in fact superior? Without substantial experience in this field, an unwise choice may be made which will cause regret for a long time, particularly if one's competitor in the U.S. has chosen a better process from another foreign source.

### Other Sources

Universities and research institutes also are possible sources of know-how abroad.

In universities, process development, except in rare instances, is usually not carried beyond the smallest bench-scale experimentation, which hardly qualifies as know-how in the broad sense of our subject. Industrial application of a process obtained from a university will almost always require extensive additional development work by the purchaser. However, it can be said that most work performed in universities is not sponsored by commercial companies, and is therefore readily available for acquisition by all comers.

There are a number of European research institutions which are sponsored by industry. Their developments are available to sponsoring companies of the particular industry, but rules vary as regards acquisition by outsiders. Frequently, however, an individual researcher will retain an equity in his inventions, and will be permitted to license them outside of his own country.

In other cases it may be necessary to negotiate with the institution for purchase of process rights, and this can become difficult when the interests of all sponsoring members, with varying degrees of dependence upon export markets, must be protected. In

general, the status of know-how available from such institutions also is relatively embryonic and requires much further work. In some instances, the work of such institutions follows paths far removed from U. S. commercial realities.

### Significant Role

In the years since the close of World War II, the American engineering company has played a significant role as a vehicle for acquiring know-how from abroad. In the first decade following the war, the flow of chemical and petrochemical technology was preponderantly from the U. S. to war-devastated countries of Europe and the Far East. During this period, numerous U. S. engineering companies established branches overseas and began to operate on an international scale. There has been no comparable operation of foreign engineering companies in this country. In the course of their work abroad, our engineering companies have made widespread contacts in the chemical industrial communities throughout the Free World, and numerous chemical processes of foreign origin are available through them as exclusive or non-exclusive agents of the originating companies for specific processes.

In obtaining know-how from or through an engineer-

*To page 87*

Holder of numerous patents and frequent contributor to literature in fields of chemistry and chemical engineering, Dr. Ralph Landau was one of the founders of Scientific Design Company, Inc., in 1946 and has been executive vice president since. He also is a director of the company. Earlier, Dr. Landau was a process and development engineer with M. W. Kellogg Co., became head of the chemical department of Kellogg Corporation, a Kellogg subsidiary.

Active in professional societies, Dr. Landau holds memberships in the American Institute of Chemical Engineers, American Chemical Society, Electrochemical Society, American Association for the Advancement of Science, Faraday Society, Sigma Xi and Pi Mu Epsilon. A fellow of Tau Beta Pi, Dr. Landau is a licensed professional engineer in New York, New Jersey and Delaware, and belongs to the Chemists Club and Advertising Club in New York.

He was graduated from University of Pennsylvania with the degree of Bachelor of Science in Chemical Engineering, and received his Doctor of Science degree in chemical engineering from Massachusetts Institute of Technology.



RALPH LANDAU



THOMAS P. BROWN

A former teacher at his alma mater, Alabama Polytechnic Institute, Thomas P. Brown became associated with Scientific Design Company, Inc., in 1954 and is now senior vice president.

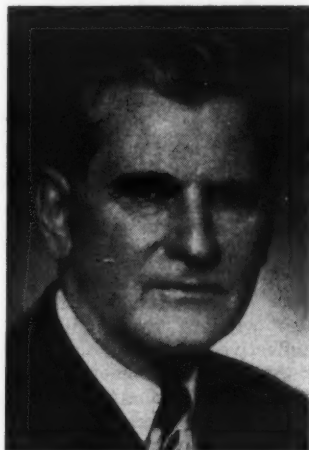
Being on the management team is no new experience for Mr. Brown. Prior to his present affiliation, he was technical vice president of Reichhold Chemical, Inc., and before that was with United Color and Pigment Co., Inc.

Mr. Brown has a degree in chemical engineering, and is a member of Tau Beta Pi, American Institute of Chemical Engineers, American Chemical Society, Commercial Chemical Development Association, Chemical Market Research Association and Advertising Club in New York.

# PESTICIDES • indicted by ignorance

Antagonists ignore rigorous standards  
bug killers must pass;  
shun widespread value

**JACK VERNON**, Vice President  
Food Machinery and Chemical Corporation  
President, National Agricultural Chemicals Association



More than 30 years' association with a company engaged in production of agricultural insecticides qualifies Jack V. Vernon to speak with authority on the pesticide controversy. Since joining the Niagara Chemical Division of Food Machinery and Chemical Corporation in 1923 as a salesman, he has moved steadily up through the ranks to his present position as vice president in charge of marketing and distribution for FMC. He also is a director of FMC International Ltd., FMC Machinery and Chemicals Ltd., and president and a director of National Agricultural Chemicals Association. Mr. Vernon was graduated from Mississippi State College and Columbia University Graduate School of Business.

**P**ESTICIDES, hailed as a "boon to mankind," are the target of the latest attack on chemical processing industries.

To date the attack has been successful. This fact makes the controversy a matter of concern for the entire chemical industry — not just the companies under fire — since such success can only be gained if the press and the general public do not have the information that enables them to sift fact from fancy. And if this is true of one group of chemicals, it is probably true of all.

The charges against pesticides say that they upset the balance of nature, destroy wildlife and are slowly poisoning the human race. Bases for these charges are research data cited out of context, or distorted, or incomplete, and the claims of less than a handful of doctors who stand in opposition to both the U. S. Public Health Service and the American Medical Association.

## Lack Background

Few members of the general public or the lay press have the background to evaluate the truth of these charges. And some members of each have been moved to join in protest against the use of insecticides.

Take the case of the gypsy moth. This pest was introduced accidentally into eastern Massachusetts in 1869. Uncontrolled for years, it now is found in parts of surrounding states. The caterpillars do the dirty work, causing great damage to fruit, shade, and forest trees of many kinds, especially oaks.

The United States Department of Agriculture recognized the threat and made plans for a comprehensive federal-state cooperative aerial spraying program, using DDT, in 1957. The project was to cover 3 million acres of forest land in New York, New Jersey, and Pennsylvania.

## Injunction Sought

When spraying began, a vocal group of New Yorkers sought a federal court injunction to halt the project.

After weighing evidence the judge ruled against objectors, holding they had not proved their claims that DDT upset nature, seriously damaged wildlife, caused human disease or harmed anyone.

But the plaintiffs had done their damage. The furor made government officials cancel a planned moth eradication program in New York State in 1958. This action could cost

the state many millions of dollars in natural resources if the program is not reinstated.

Almost coincidental with the New York federal court ruling was the appearance in a national magazine of an article entitled "Pesticides Are Poisoning Us." The same discredited charges rejected by the court as untrue were woven into a fairly convincing "horror story." It was convincing to many people who do not understand science and who are suspicious of many new products stemming from the chemical industry's laboratories.

This is the paradox of pesticide chemicals. Farmers, physicians, scientists, public health officials praise the materials as "economic blessings." Based upon an extensive investigation conducted by the U. S. Public Health Service, Dr. David E. Price, assistant surgeon general of the United States, was able to say, "Pesticides are a boon to mankind."

## 'Insidious Threat' Claimed

Even so, there are those who claim pesticide chemicals are "an insidious threat to human life."

Compare this charge to the public health service's report

To page 88





DR. E. M. KIPP has been director of research for Foote Mineral Company since May 1, 1957. Previously, he was director of one of the research divisions of Aluminum Company of America, and was otherwise associated with this firm from 1939 until he joined the Foote organization.

Among his past professional activities are the national chairmanship of the committee on planning and publications, American Society of Lubrication Engineers; national president, ASLE; national chairman, projects and publicity committee, ASLE. He also is an ASLE director.

A member of the American Chemical Society, Dr. Kipp also is active in various phases of American Society for Testing Materials work. He has served as guest lecturer at Georgia Institute of Technology, University of Pittsburgh, Massachusetts Institute of Technology and Fenn College, Cleveland, Ohio. Dr. Kipp is a fellow in the American Institute of Chemists and the New York Academy of Science.

He received the degree of Bachelor of Science in Chemistry from Iowa Wesleyan College; a Master of Arts from Boston University, and his doctorate from Pennsylvania State University. His specialty is the field of physical chemistry.

Competent leadership provided by management can weld the thinking of widely divergent personalities into a hard-hitting research and development team. Here is a 7-point program of administrative policies, group leadership techniques and skills to show . . .

## 'Odd balls' can make the team, too

DR. E. M. KIPP

Director, Research and Development  
Foote Mineral Company

**B**OTH individual and team effort is required to carry out a well-balanced industrial research program. I believe that geniuses, often misnamed "odd balls" because of their non-conformist tendencies, can operate in both areas even though there are those who maintain that highly creative non-conforming scientists should be relegated to some barred cubicle labeled "do not feed."

With proper administrative policies and group leadership techniques and skills, I believe that the genius can make worthy contributions to team research and still maintain his identity.

### Broad Problem

Indeed, the issue is real and significant, but it is only an extreme aspect of a broader problem. The problem basically is whether it is possible and desirable to organize, administer and support coordinated research activities to provide an environment in which individual members of a group can contribute significantly, consistent with indi-

vidual personalities, interests and aptitudes.

In brief, is it a matter of basic incompatibilities, or is it primarily a question of administrative leadership?

I have not found there need be any basic conflict between team and group research and the effective functioning of a highly-creative, non-conformist scientist.

### Skilled Leadership

Nor do I believe that for group research to be effective that it must comprise only those individuals of similar personalities and conformist skills. The key to the matter lies in perceptive, skilled leadership of high empathy content.

The perceptive, gifted independent thinker frequently will find himself a minority in team research. You may therefore ask:

"Must he conform, or is it

inevitable that he will disrupt the team morale and performance?" or "Is it possible for him to avoid either alternative while working at an acceptable degree of personal satisfaction and good morale as a team member?"

The key lies in selection, training and management support of persons, policies of leadership and management supervision required to blend effectively a diversity of talents and personalities, including the "odd balls," into an effective team.

### 'All For One'

I believe it is feasible and practicable to incorporate highly creative, independent-thinking scientists into a group or team effort. Moreover, I believe it is a very worthwhile thing.

But the molding of a collaborative research and development team is contingent upon

what I call "Seven Administrative and Leadership Principles" which I have found to be effective. They are:

1. At the initial meeting, it is important that the proposed problem or objective be clearly and explicitly introduced by a representative of research and development management. A balanced presentation should be made of background data, justification and the anticipated use or benefits. It is desirable that company policies be discussed extensively.

2. A temporary chairman or moderator should be appointed. He should be neutral and one who is a generally respected member of R & D management's group. It is imperative he should not be directly involved in nor responsible for the proposed project.

3. The chairman should develop spontaneous discussion for expression of individual

To bottom page 89

# Exchanging Technical Information with Foreign Companies

**HARRY KREHBIEL**  
President  
Catalin Corporation of America

**CONFIDENCE** and trust — vital results of human relations — form the soundest bases upon which successful agreements can be reached between U. S. firms and foreign companies in the exchange of technical information.

Our friends in the chemical processing industry abroad are open to ideas and suggestions. With the jet age already launched, companies the world over are eager to take advantage of progress being made elsewhere. Many of them, however, are bridled by restrictions foreign to the American way of doing things, and U. S. businessmen must understand this before attempting to consummate agreements

to exchange technical information.

The problem of limited cash is a very realistic one for many foreign companies. Because of their country's economic situation, they are not in a position to purchase U. S. know-how. But on the other hand they are willing, in many cases, to turn over a minority stock interest in exchange for processing data.

This arrangement benefits such companies by making available newer and better manufacturing methods. American firms often would want to hold this stock and grow with the foreign company, later disposing of the securities and taking a capital gain.

A different situation might obtain in England and Australia, however, because of better economic conditions in those countries. American firms then might elect to retain the stock for long-term appreciation and dividend returns.

On the other hand, an agreement might be worked out whereby an American company would receive not only a fee but would be entitled to any knowledge of improved techniques of production that the licensee may develop. In another type of agreement, no fee is involved but American information and know-how is supplied in exchange for specified formulae and processes owned by a foreign company. Under a fourth type of agreement, an American company would receive know-how and technical

assistance and the foreign firm would collect a fee.

Regardless of the type of agreement evolved, its consummation often could be the result of mutual confidence and trust.

To illustrate, a French firm working under a licensing agreement with our company recently called our attention to a working relationship with a Belgian firm engaged in the same field of endeavor.

In the first meeting with executives of the Belgian firm, it became evident that our common experiences in the synthetic resin industry, plus our introduction through French friends, gave us a feeling of close kinship. This set up an atmosphere of mutual trust and understanding that made further discussion easy and led to a satisfactory consummation of a new agreement.

As a result, our company today is manufacturing and selling emulsions and solutions of acrylic polymers used for plastic paints, coating and adhesive applications, leather treating, paper and textiles under a 10-year license agreement.

But there are pitfalls in working out arrangements with foreign companies. Of great importance is the necessity of the American firm to make certain that whatever processing know-how it acquires will match up with existing facilities. Also, that a comprehensive survey be made of the country in which an exchange of technical information is sought to ascer-



Harry Krehbiel (left), Catalin Corporation of America president, with Ivan Lebrun, general manager of Chemical Specialties Division of Union Chimique Belge, S. A., Brussels, Belgium. Catalin will manufacture and sell emulsions and solutions of acrylic polymers under 10-yr licensing agreement with Belgian firm

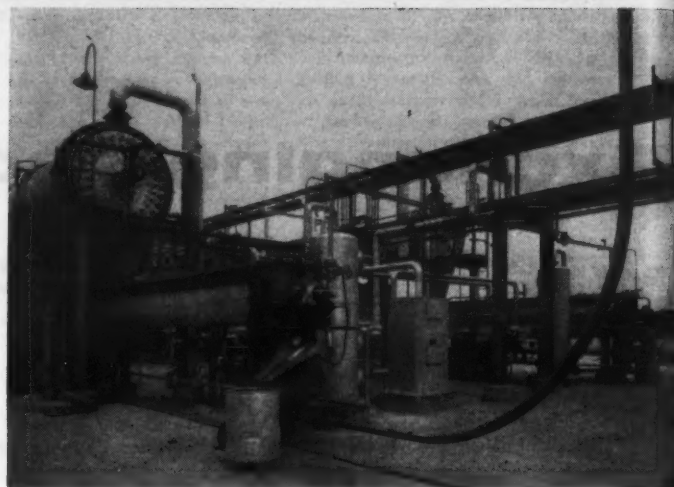
tain its political situation in event of a "little war," which could place into undesirable hands valuable American processing secrets.

Executives today find that command of at least another language besides English helps them considerably in acquiring new business. It is much easier to establish good hu-

To page 92

From a one-man sales department in 1931 to president of his company just 13 years later is a capsule description of Harry Krehbiel's meteoric rise in the business world. He was 33 years old and had been an agent for foreign machinery manufacturers when he joined Catalin Corporation of America 27 years ago. Experienced in selling to the chemical, rayon and plastics industries, he was instrumental in increasing Catalin's sales volume from \$300,000 to \$523,000 within a year — and a depression year at that. In 1957, Catalin had a sales volume of more than \$24 million. By 1933, Mr. Krehbiel was sales manager; in 1938 he was named vice president; he was elected to the board of directors in 1941 and became president in 1944 upon the death of William Theile.

Polyethylene leaving dryer at left enters screw conveyor, then passes to pneumatic conveyor through special injector. Intake filter (cylinder in center) and two line filters purify incoming air for conveying



Moving product from dryers through finishing area to shipping . . .

## Pneumatic Conveyor for Polyethylene Operated by One Man

Completely enclosed system keeps product free of dust, moisture, and other forms of contamination

A superb example of modern materials handling is shown by the extensive pneumatic conveying system for polyethylene at the recently opened plant of Celanese Corporation of America near Houston, Texas. Pneumatic system moves the plastic coming from dryers all the way through the finishing area to shipping. Entire system is supervised from a central control panel by one man, minimizing labor costs.

It is very important to eliminate any possibility of contamination in a product like polyethylene. Pneumatic system is completely enclosed, keeping material free of dirt, moisture, or foreign objects.

Polyethylene made at the Celanese plant is the linear type. It is called Fortiflex. Rated production of plant is 40 million lb/yr.

Pneumatic conveyor system is integrated with all parts of process involving polyethylene in dry bulk form. This includes drying, extrusion, pelletizing, blending, and bag-

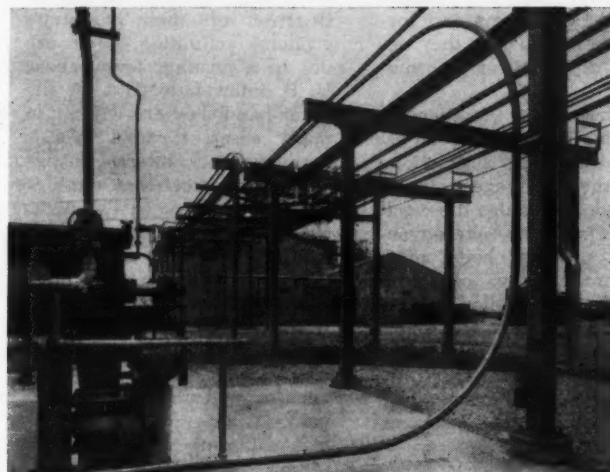
ging or bulk loading.

Overall system starts at the dryers. Two conveyors move "fluff" (polyethylene in cornmeal-like form) from two rotary dryers to primary storage prior to extruding and pelletizing processes. "Fluff" enters each conveyor through a special injector at the end of a screw conveyor leading from each dryer.

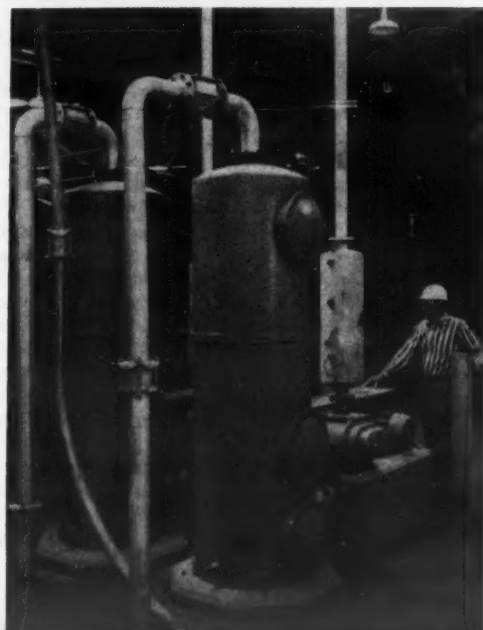
Air for each pneumatic conveyor is supplied by a 15-hp motor and positive displacement blower. Conveying air is filtered twice before picking up material at dryer discharge points — once by an intake filter before blower and once by a line filter after blower. Rated conveying capacity for the "fluff" system is 3000 lb/hr.

"Fluff" enters either of two primary storage bins. Atop each bin is a cloth-bag filter for bin ventilation. Dust collected from conveying operations drops directly from the filter hopper into the bin for subsequent processing.

To page 38



Conveyor line leading from dryer discharge point to processing building



Electric motor, blower, and line filters for conveyor system which moves pelletized polyethylene to intermediate storage. Operator shown runs entire handling system from centralized controls



## NEW SOLUTIONS of processing problems

First two stages of gas compression plant at Odessa Butadiene. First stage is furnished by two compressors in background driven in tandem by steam turbine in rear, not visible. Second stage is provided by compressor in center driven by steam turbine in foreground



# CENTRIFUGAL COMPRESSORS

## amass 7000 hours trouble-free petrochemical service

**Waste heat from gas turbines is used to supply  
portion of heat for butadiene catalyst regeneration**

**GORDON WEYERMULLER**, Petrochemical Editor  
with **DONALD C. KLEIN**, Assistant Plant Manager  
Odessa Butadiene Company

Six multi-stage centrifugal compressors have been in practically continuous operation ever since they went on stream at Odessa Butadiene Company at Odessa, Texas in August 1957. Operation of units has been highly satisfactory and is considered to be a good solution to the problem of meeting compression needs of a butadiene plant by most economical method.

Compressors are made so that two or more units can be driven by one turbine. Two of compressors at Odessa Butadiene on hydrocarbon service require only one turbine drive.

One unusual feature of the plant is the two gas turbines used to supply regeneration air to catalyst. Combustion gases used to fire these turbines are exhausted to process, heat of these gases helping to supply heat required and to burn carbon off of cat-

alyst beds in reactors.

About 20% of the regeneration air is furnished by a centrifugal compressor. Regeneration air leaving catalyst bed is "squeezed" in two waste heat boilers to produce 186,000 lb of 250-psi steam/hr for use in plant.

### Butadiene Process

In the Houdry process, normal butane and recycle butylene are dehydrogenated to form butadiene. Butadiene-rich gases, following quench oil cooling, are compressed from 2.2 to 147 psia. Four centrifugal compressors are used in this operation — two on first stage and one each on second and third stages. Three steam turbines drive these compressors. The two compressors on first stage are the ones driven in tandem by one steam turbine unit.

Compressed hydrocarbon gases flow to an absorber for

first step of subsequent operations in which pure butadiene is obtained. Next step involves fractionation.

For final purification step, affinity of cuprous ammonium acetate solution (CAA) for unsaturated hydrocarbons, is utilized. Butadiene is taken preferentially into solution while butane and butylenes float to top in settlers. The cooler the solution, the greater

the affinity of the CAA solution for unsaturated hydrocarbons. For this reason, a 5430-hp propane refrigeration system is employed to cool the CAA solution. A centrifugal compressor is used to compress the propane.

All six centrifugal compressors in use at plant have horizontally split cases. This type of case, suitable for pres-

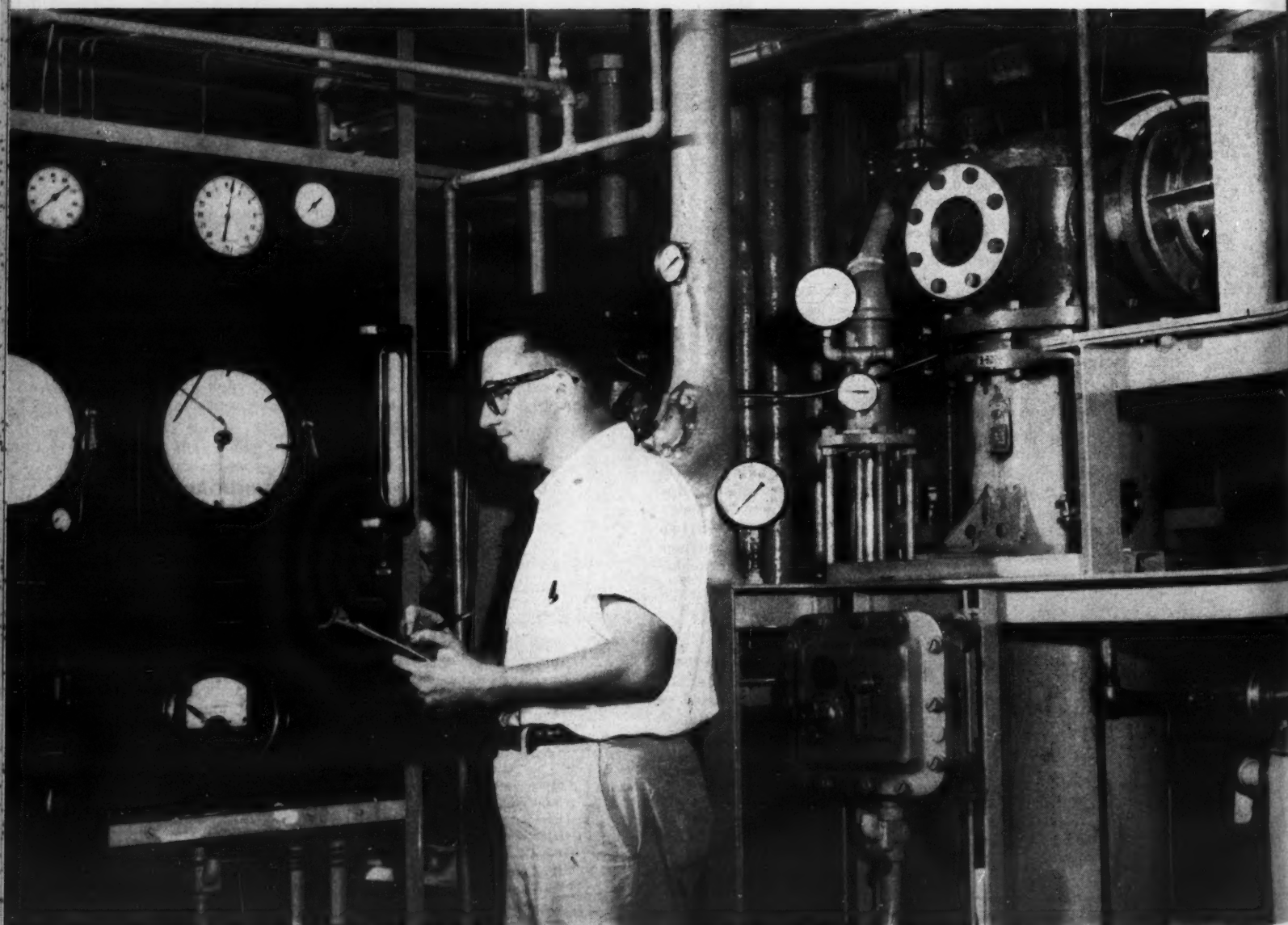
To page 39

### DESIGN CONDITIONS FOR CENTRIFUGAL COMPRESSORS INSTALLED AT ODESSA BUTADIENE

Model	Compressed Air Service	Hydrocarbon Service		Propane Refrigeration Service	
	5M3	6M4	5M6	3M5	3M7-5
Number of units	One	Two	One	One	One
Impeller diameter, in	42.5	48	48	32	32
No. of impellers	3	4	6	5	5
Type gas handled	Air	Hydro- carbon	Hydro- carbon	Hydro- carbon	Propane
Molecular weight	28.58	37.7	37.0	36.5	44
Isentropic exponent	1.397	1.125	1.128	1.130	1.144
Inlet pressure, psia	13.0	2.0	9.05	36.9	30
Inlet temperature °F	100	110	100	100	-5
Relative humidity, %	50	—	—	—	—
Discharge pressure, psia	27.5	9.55	37.9	160	210
Discharge temperature, °F	275	225	225	225	153
Capacity at inlet conditions, cfm	56,500	211,000	45,500	10,450	—
Weight flow, lb/hr (dry)	206,000	2598	2541	2390	150,000
Bhp	3710	4250	3800	3750	4980
Speed	3800	3200	3200	6550	6000

Placing a new product into production seldom is done without difficulty. Abbott Labs, ready to start turning out ristocetin, ran into trouble in the concentrating step of the process. However, turbulent-film evaporator, handling heat-sensitive material . . .

## • Solves Product Discoloration •



Turbulent-film evaporator, upper portion of which can be seen at right, helps produce top notch pharmaceutical product at Abbott Laboratories. Gerold F. Hiemer, process engineer, checks instruments during production run

*CP Staff Photo*

# • Boosts Drug Yield

TED F. MEINHOLD, Associate Editor  
with ALVIN BIEGAY, Manager of Antibiotic Isolation  
Abbott Laboratories

**PROBLEM:** Product discoloration and loss of product were being encountered prior to placing the bacteria-killing drug, ristocetin, into full production at Abbott Laboratories, North Chicago, Illinois. Scheduled to be marketed under the tradename, "Spontin", the heat-sensitive antibiotic had to be put through an important concentration step before it could be further purified and processed into final form.

Discoloration was caused by high film temperatures existing in the conventional, long-tube, vertical evaporator used in the process. Material sticking to tubes resulted in abnormal product loss from burning.

Evaporation was carried out at 35°C under 20-30 mm vacuum. Two-stage steam jet furnished the vacuum.

Further complications were encountered when process modifications required substituting a solvent solution for water portion of feed. Since evaporator was not designed for solvent recovery, it was impossible to perform the concentration step without losing most of the solvent through the steam jet.

**Solution:** The conventional evaporator was replaced by a turbulent thin-film type unit. Especially designed to handle heat-sensitive products, similar units can safely handle materials with viscosities up to 100,000 centipoises.

Evaporation takes place in a large, jacketed vertical tube. A controlled-speed agitator rotor extends down through

entire axis of evaporator tube. Blades attached to rotor come within 0.030" of steam-heated chamber wall and keep film circulating evenly with turbulent action. Exposure of any single particle of material to heat lasts only a few seconds. Continuous turbulent motion also prevents localized overheating.

Upper expanded separating section of evaporator functions as entrainment separator and foam breaker. Any particles entrained in vapor stream are carried up into upper section, impinging against stationary, unheated baffles on which they coalesce and return by gravity to evaporating section.

Abbott's unit measures 26" OD by 107" high, occupies only small amount of floor space. Evaporator has 9 sq ft heat transfer surface. Evaporating section, condenser, pipe, and valves are constructed of 316 stainless. Rotor, separating section, and vapor outlet are made of 304 stainless. Rotor is driven by 10 hp motor. Abbott performs the concentrating job in two passes. Solution is pumped into upper portion of evaporating section at rate of 3 gpm for the first pass.

Processing temperature during first pass is 25-30°C. Hold-up time for material passing through unit is about 8 seconds. Vapor temperature reaches 35°C. Vacuum is maintained at 100-120 mm, using one stage of double-stage steam jet. Rotor speed, which can be varied between 375 and 1125 rpm, is held at approximately 750 rpm.

First pass strips off all the solvent and part of the water. Volume reduction is about 3 to 1. To assure gradual removal of solvent without flashing, evaporator is equipped with automatic control valve that maintains constant steam pressure in jacket. Device holds steam pressure at 15 psi, regardless of flow rate through evaporator.

Second pass again effects a volume reduction of about 3 to 1. Feed rate during second pass is 1 gpm. Temperature is 20-25°C. Vacuum is maintained at 10-20 mm, using both stages of steam jet.

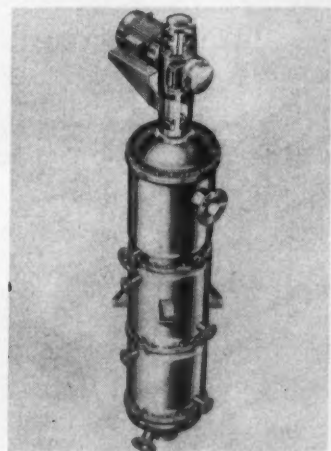
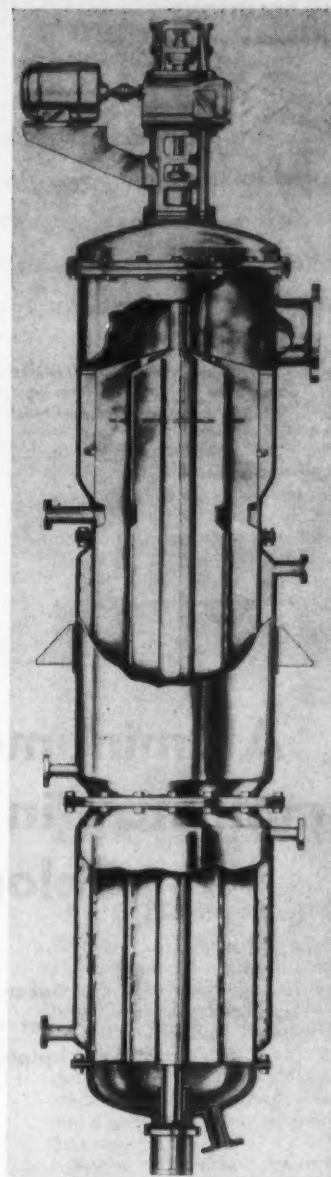
**Results:** Full production of the drug started. Discoloration and product loss no longer presented a problem. In operation for almost a year, the turbulent-film evaporator helps turn out a uniform, top-quality pharmaceutical product. Overall processing time was cut considerably over previous method.

Taking up minimum floor space and operating essentially automatic, evaporator requires only one part time operator. There has been no maintenance required on the equipment to date. After each batch, evaporator is easily flushed with washing solutions which maintain the cleanliness so necessary to this type of operation.

(Turba-Film Processor was supplied by Process Equipment Division, Rodney Hunt Machine Company, 117 Vale Street, Orange, Mass.)

Check 2702 opposite last page.

Cutaway view of turbulent-film evaporator. Blades attached to rotor come within 0.030" of jacketed wall

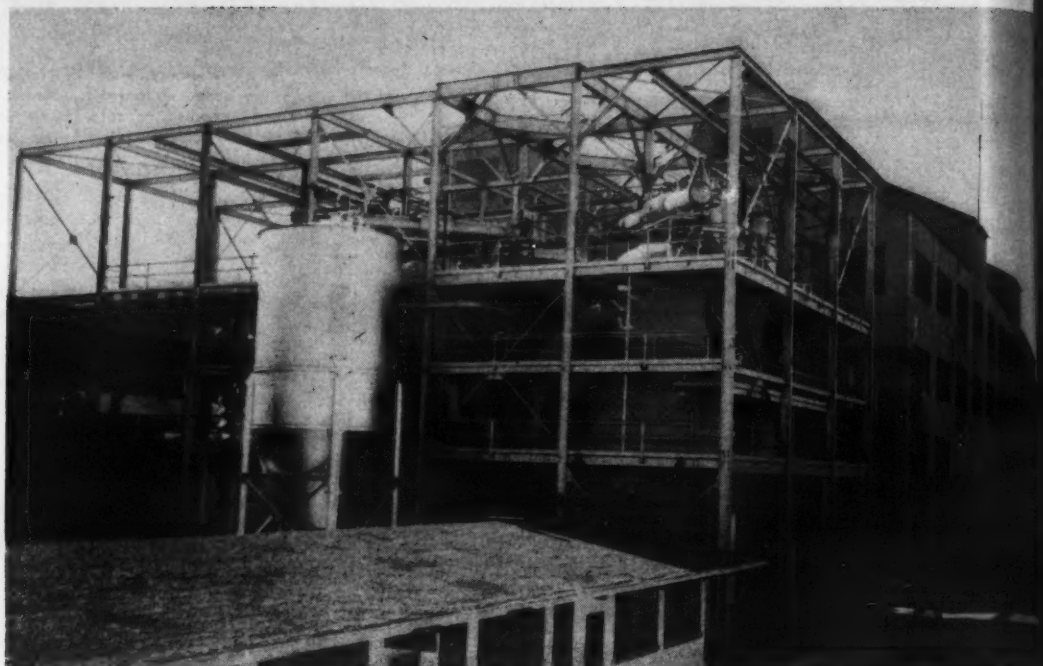


Unit is especially designed to process heat sensitives



**NEW SOLUTIONS**  
of processing problems

Aluminum-bronze alloy crystallizers, which produce large-size, uniform crystals, helping to maintain high quality of product



## Aluminum-Bronze Alloy mainstay in fight against Chloride Corrosion

Recently developed style which does not stress crack is used for process piping and seven large crystallizers



Two 10" aluminum-bronze liquor lines carrying saturated potassium chloride solution from dissolver to crystallizer plant at 210°F

**GORDON WEYERMULLER**, Associate Editor  
with **EARL H. MILLER**, Vice Pres. & Resident Mgr.  
United States Potash Company,

Div. of United States Borax & Chemical Corp., Carlsbad, New Mexico

**Problem:** Alloys noted for corrosion resistance were badly attacked by high chloride solution handled at the United States Potash Company. Plant, which processes potash ores, uses saturated neutral KCl-NaCl solutions ranging from 100 to 210°F.

Other alloys tried, either had a high corrosion rate or were subject to stress corrosion cracking. During a period when certain alloys were short in supply, plant switched over to using aluminum-bronze alloys after a series of corrosion tests. Aluminum-bronze exhibited good corrosion resistance to chloride solutions. However, plant had some trouble with stress corrosion cracking or breakage at welds.

**Solution:** Within the last year or two plant started using equipment made from a recently developed, patented aluminum-bronze alloy, known as Ampco metal Grade 8, which has greatly improved

stress corrosion cracking characteristics.

Process piping is now being replaced with this alloy in sizes up to 24" diameter. Seven large crystallizers made of the alloy — 18' in diameter and each with a capacity of 40,000 gallons — were placed in service in early 1957. These vessels produce large-size, uniform crystals, helping to maintain high quality of product.

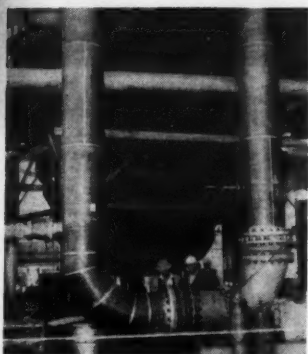
All piping used on crystallizers is Ampco metal Grade 8. In addition, stirrer blades, steam coils, rake assemblies, separator plows, and other processing equipment have been made of the alloy.

In changing the basic copper-aluminum-iron composition of the alloy to avoid stress corrosion cracking, an extensive research program was undertaken. It was found that introduction of 1/3 of 1% of either tin or silver produced the modification that elimi-

nated stress corrosion cracking.

New alloy still retains its corrosion resistance, good mechanical properties, and workability. It is usually not necessary to stress relieve finished fabrications of the alloy to avoid stress corrosion cracking. Also, alterations can be made freely in field without heat treatment.

**Results:** Ampco metal Grade 8 has become a mainstay in the battle against corrosion at United States Potash. Crystallizers made from the alloy are still in excellent condition



A 24" aluminum-bronze circulating pipe, which handles 9,000 gpm of 160°F saturated potash brine. At bottom of this U-shaped pipe is a Lawrence propeller-type pump, also made of Ampco metal alloys. In background is one of 18'-diameter crystallizers made of the alloy

after more than 18 months service. Only two leaks have developed in the piping, these being due to welding defects.

(Grade 8 alloy is product of Ampco Metal, Inc., 1745 S. 38th St., Milwaukee, Wis.)

Check 2703 opposite last page.

(Krystal® crystallizers are product of Struthers Wells Corporation, Warren, Pa.)

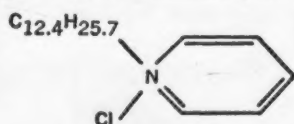
Check 2704 opposite last page.

**Dust collection system** recently installed for collecting nearly 5 tons of dust per hour is described in eight-page bulletin. Illustrations covering both first and second stage collectors comprising 48 cyclones and 2 giant twin-section electric precipitators, respectively, are included. Dust Collector Bul — Buell Engineering Company, Inc., 123 William St., N.Y., N.Y. Check 2705 opposite last page.

## BRIEFS

### This detergent kills germs

You may be missing something big if you haven't looked lately at the properties of lauryl pyridinium chloride.



We produce this as a technical-grade mottled tan semi-solid, containing 85.0% min. alkyl pyridinium chloride calculated as C<sub>12</sub>. It is greasy or soapy to the touch, and lathers freely in water.

Surface tension of a freshly prepared aqueous 0.01% solution at 25°C is 55 dynes/cm; of a 0.1% solution, 45 dynes/cm; of a 0.5% solution, 33 dynes/cm. The surface tension of dilute solutions becomes even lower during aging.

In aqueous solutions more dilute than .01N, the solute is molecularly dispersed. In stronger dispersions, the lauryl pyridinium cations are aggregated into colloidal micelles, but the solutions look clear to the naked eye.

Indications are that, like other quaternary ammonium compounds, lauryl pyridinium chloride has good germicidal properties. It is a potent bactericide against gram-positive and gram-negative microorganisms.

**Where can you use it?** At present, a major use is in wetting and lubricating the tiny spinnerette holes through which viscose squeezes just before it becomes rayon.

Some other places where you might put it to work, if your field of interest is:

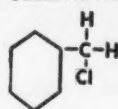
**Textiles**—for cleaning fibers; in water-soluble lubricants; as wetting agents, color modifiers.

**Pharmaceuticals**—as industrial germicides; in disinfectants, preservatives; antiseptic soaps.

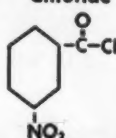
**Agriculture**—in insecticides, fungicides, horticultural sprays.

**Elsewhere**—intermediate for foam-resistant compounds; general cationic emulsifying, dispersing and wetting agent; photosensitivity modifying agent; leveling agent in polishes and waxes; lubricant for preparation of hydrophobic surfaces to promote dropwise condensation.

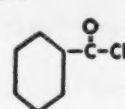
As an exploratory starting point, why not check the coupon for a data sheet on this product? If you'd like an evaluation sample, please write us on your business letterhead.



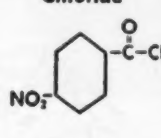
Benzyl Chloride



m-Nitrobenzoyl Chloride



Benzoyl Chloride



p-Nitrobenzoyl Chloride

### Four versatile aromatic chlorides

These Hooker aromatic compounds give you easy, practical ways of putting benzyl, benzoyl, and nitrobenzoyl groups into organic compounds, particularly through Friedel-Crafts reactions.

Each of these compounds will undergo other reactions to produce a variety of useful products.

All four compounds are high-quality chemicals. On two of them—*meta*- and *para*-nitrobenzoyl chloride—Hooker is the only brand available in commercial quantities.

**For more information** on chemicals mentioned on this page, check here:

- |   |  |
|---|--|
| <input type="checkbox"/> Lauryl Pyridinium Chloride | <input type="checkbox"/> p-Nitrobenzoyl Chloride                                   |
| <input type="checkbox"/> Benzyl Chloride            | <input type="checkbox"/> Caustic Soda  |
| <input type="checkbox"/> Benzoyl Chloride           | <input type="checkbox"/> Caustic Soda Engineering and Handling Guide, Bulletin 102 |
| <input type="checkbox"/> m-Nitrobenzoyl Chloride    |  |

**Clip and mail** to us with your name, title, and company address. (When requesting samples, please use business letterhead.)

### HOOKER CHEMICAL CORPORATION

512 FORTY-SEVENTH STREET, NIAGARA FALLS, N. Y.

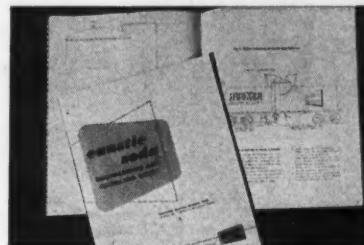
Sales Offices: Chicago Detroit Los Angeles New York  
Niagara Falls Philadelphia Tacoma Worcester, Mass.  
In Canada: Hooker Chemicals Limited, North Vancouver, B.C.

**HOOKER**  
CHEMICALS  
PLASTICS

on a quaternary ammonium compound that kills germs while it cleans ... on some easy ways to get benzyl and benzoyl groups for your reactions ... a manual on handling caustic soda

You can order as little as a 5-gallon container of these compounds, or as much as a carload.

If you'd like to know more about the specifications and physical and chemical properties of these compounds, check the coupon for technical data sheets.



### 40-page manual tells how to handle caustic soda

Written for engineers, this 40-page Hooker manual sums up newest techniques for handling and storage of liquid caustic soda.

Contents include detailed diagrams of equipment; a section on materials of construction; recommendations for unloading, diluting, piping, and storage; and a section on safety precautions and first aid.

For a copy, check the coupon for Hooker Bulletin 102, *Caustic Soda Engineering and Handling Guide*.

Check 2706 opposite last page



# BASIC WEIGHT CLASSIFIER

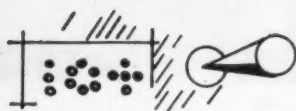
...new aid for controlling  
your quality and costs



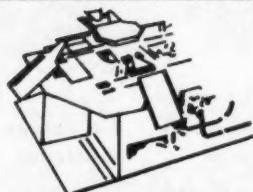
**CHECKWEIGHS**  
products  
packages and  
assemblies

**CLASSIFIES**  
by weight

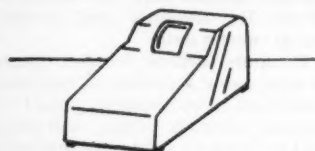
... and through electronic  
controls, performs these and  
many other remote functions!



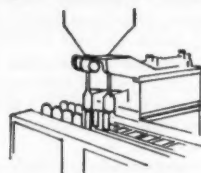
**OPERATES SIGNALS**



**ACTUATES MECHANISMS**



**RECORDS DATA**



**CONTROLS PROCESSING**

Now you can checkweigh or classify items by weight and utilize the data wherever you need it—and in the form that best fits your needs. The Basic Weight Classifier, employing Shadograph Scale with photocell controls, provides electronic signals which indicate correct weight, or over or under within pre-set limits. Any number of classifications from 2 to 128 may be used. Units are available to handle items in any shape in a capacity range from 2,000 milligrams to 100 lbs. Write for Bulletins 3333 and 3347.



**THE EXACT WEIGHT SCALE CO.**

905 W. FIFTH AVE., COLUMBUS 8, OHIO

In Canada: 5 Six Points Road, Toronto 18, Ont.

*Sales and Service Coast to Coast*



**BETTER QUALITY CONTROL . . . BETTER COST CONTROL**

Check 2707 opposite last page

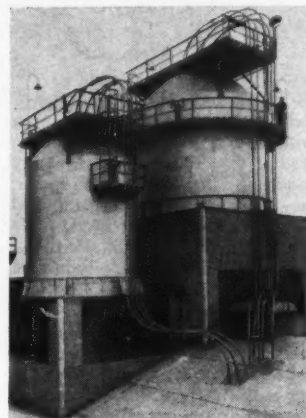
## NEW SOLUTIONS

### Pneumatic Conveyor

From page 32

Material is gravity-fed from primary storage to extruders. Extruded polyethylene is then cooled before entering the pelletizing machines. These machines discharge polyethylene pellets back into the conveying system through rotary feeders.

Pelletized product is conveyed to either of two intermediate storage bins above blenders. Again conveying air is thoroughly filtered to assure product purity. Blenders are gravity-fed from the bins.



Conveyor lines lead from pelletizer to two intermediate storage bins. Rear bin is for finished product storage of polyethylene ready for shipment to plastics processors

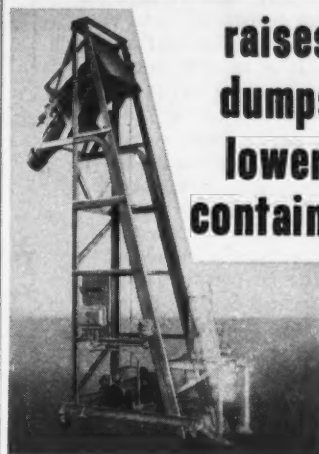
Under each blender is a telescoping chute, which directs blended polyethylene into a rotary feeder for discharge into the conveying system. Chute is remotely controlled. During blending it is out of the way; when blending is finished, it rises against the flange of the blender to receive the product. Blended polyethylene is now conveyed to finished product storage for subsequent shipment to plastics processors.

(Pneumatic conveying system—including filters, rotary feeders, and telescoping chute—was designed and fabricated by Dracco Div., Fuller Company, 4063 East 116th St., Cleveland 5, Ohio.)

Check 2708 opposite last page.

# G-W PORTABLE DRUM DUMPER

**raises,  
dumps,  
lowers  
containers**



**... only 2 buttons to push!**

Unloading full drums, barrels, or containers is easy with this simple rugged machine. Move it almost anywhere on its sturdy rubber casters. Then push the UP button to raise and empty a drum over a high vat edge; press DOWN button to return the carriage for a fresh load.

G-W Drum Dumpers can be "tailored" to meet your weight requirements. Specially designed carriages will handle any size and type of container.

Fully Automatic drum handling systems are one of G-W's materials handling specialties. Engineered for the needs of large or small plants, these systems can handle 30 to 40 containers an hour—through loading, unloading, washing and storage.

Mail the coupon below for your free copy of G-W's Idea Book on Materials Handling, plus details on modern drum handling methods.

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Equipment • Ice Handling Equipment**  
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Colloid Mills



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Please send me complete details on the  
Drum Dumper, plus G-W's "Idea Book"  
on materials handling.

Name & Title \_\_\_\_\_  
Company \_\_\_\_\_  
Address \_\_\_\_\_  
City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_

Check 2709 opposite last page

CHEMICAL PROCESSING



## NEW SOLUTIONS

### Centrifugal Compressor

From page 33

sure up to around 800 psig, allows maximum accessibility. Minimum bearing span permits up to 10 impellers to be utilized in a single case. Design of unit, with integrally supported bearings, assures permanent alignment.

#### Odessa Butadiene

Odessa Butadiene Company is a joint venture of El Paso Natural Gas Products Company (subsidiary of El Paso Natural Gas Company), W. D. Noel and E. G. Rodman of Odessa, Texas, and The United Carbon Company. The Odessa Butadiene plant, designed to produce 50,000 tons of butadiene per year, is part of the first privately financed, totally integrated complex making synthetic rubber from butane. Other plants in the complex are styrene plant of Odessa Styrene Company and synthetic rubber plant of General Tire & Rubber Company.

(Multi-stage centrifugal compressors and gas turbines are products of Clark Bros. Co., Olean, N.Y., One of The Dresser Industries.)

Check 2710 opposite last page.

(Plant was designed and constructed by Fluor Corporation, 2500 S. Atlantic Blvd., Los Angeles, Calif.)

#### GE whips mixing job with stainless steel vertical mixer

Processes polycarbonate resin; unit solves 4 big problems

**Problem:** An efficient method of blending "Lexan", a polycarbonate resin molding compound, was sought by Chemical Development Department, General Electric Company. Product had to be blended in 1/8" chopped rod pellet form just prior to packaging.

Four major requirements had to be met. Material had to be kept warm during proc-

## TWO Fisted Performance

In pumping chemicals, maximum service satisfaction is dependent on *two* factors. Design and construction quality constitute one factor; the other is the accuracy of the foundry in meeting metallurgical specifications for corrosion resistance.

Because LaBour pumps embody such important and exclusive features of design it is perhaps easy to overlook the fact that LaBour foundries employ equipment and techniques second to none for precise control of alloy composition and grain structure.

That's why, when you buy LaBour, you get *two*-fisted performance assurance. Top ability to resist corrosion and top ability to move liquids economically and dependably are combined in these pumps. Ask for Bulletin B-1b.

#### REGULAR PRODUCTION IN LaBOUR FOUNDRIES INCLUDES THESE ALLOYS:

- Electric Furnace Cast Iron
- Bronze
- Lead
- Aluminum
- R-55 (Chrome-Nickel)
- Y-17 (Chrome-Nickel-Molybdenum)
- Y-30 (Nickel-Molybdenum)
- 149 Stainless Steel
- 304 Stainless Steel
- 316 Stainless Steel
- Elcomet K (High Nickel Stainless)

ORIGINAL MANUFACTURERS OF THE SELF PRIMING CENTRIFUGAL PUMP

# LABOUR

THE LaBOUR COMPANY, INC. • ELKHART, INDIANA, U. S. A.

Check 2711 opposite last page



ANOTHER NEW **LESLIE** PRODUCT

# ADJUSTABLE PROPORTIONAL BAND

*Floatless*

# LIQUID LEVEL CONTROL

**...with adjustable level ranges up to 0-200"**

Here is a new differential pressure-type liquid level control pilot that combines the wide adjustable level ranges in the table shown below with a 2-20" or 7-25" adjustable proportional band.

ADJUSTABLE LEVEL RANGE — INCHES	ADJUSTABLE PROPORTIONAL BAND (INCHES, H <sub>2</sub> O)	CONTROL PILOT TYPE
0-40 or 0-87	2-20	LAP
0-30 or 0-91	2-20	LABP
0-200	7-25	LAUP

Maximum Static Pressure — 300 psi

## One Knob — Easy Adjustment

A single knob adjustment quickly sets the proportional band where you want it, even while the system is in operation. The liquid level is maintained constantly within that band until you re-set the control pilot for new conditions.

## Applications

Leslie-Level-Matic Control Pilots are used in either open or pressurized vessels to control the level of virtually any liquid including water, gasoline, oil and chemical solutions. The new control pilot is particularly useful to maintain constant levels where there are high flow rates through vessels with small cross sectional areas.

## Float Cages Eliminated

There are no floats or cages needed for Leslie-Level-Matic Control Pilots, and no torque tube seals, stuffing boxes, or thermohydraulic systems. All of the primary control elements are in one place and may be installed with a fraction of the effort and cost required for displacement-type controllers.

## Vibration-Proof, Dependable

All of the dependability factors for which Leslie products are so well-known are incorporated in this new control pilot, as well. Rugged, accurate, stable — it is unaffected by normal vibration or turbulence.

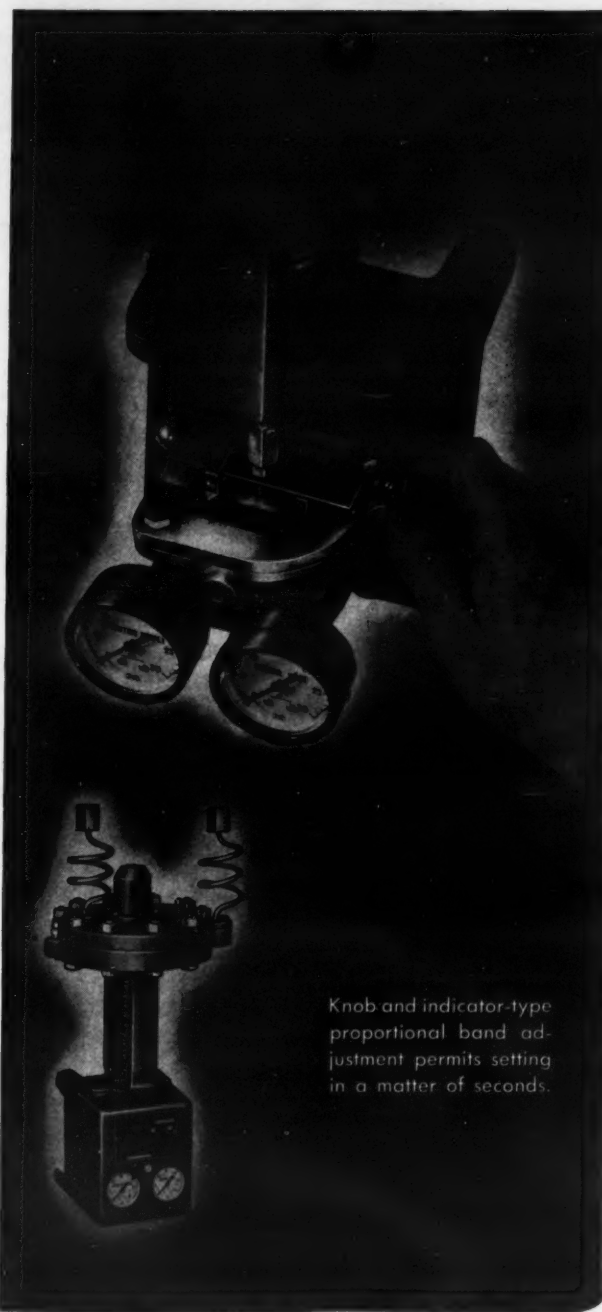
## More Information

Send for Engineering Data Sheet describing this new Control Pilot and outlining its principle of operation.



**REGULATORS and CONTROLLERS**

LESLIE CO., 281 Grant Avenue, Lyndhurst, New Jersey



Knob and indicator-type proportional band adjustment permits setting in a matter of seconds.

## NEW SOLUTIONS

essing; floor space was at a premium; excessive attrition had to be avoided; and it was desired to feed product to equipment from ground level.

**Solution:** A stainless steel, 50 cu ft capacity, vertical mixer was decided upon. Measuring about 11 ft high and 5 ft in diam, unit is jacketed for 14.7 psi steam pressure. Mixer, including table-height loading



Product is fed to vertical mixer through table-high hopper

unit, occupies less than 15 sq ft floor space.

Use of steam jacket solved problem of keeping material warm during processing. Vertical design of mixer took care of floor space requirements.

## Vertical Design

Ground floor feeding was also achieved by unit's vertical design. Mixer is supported by four vertical legs attached to its sides. Hopper is centered just about table-top level for convenient feeding. Forced feed-in screw and elevating section below mixing cone offers maximum efficiency.

**Results:** The vertical mixer handles the job smoothly and efficiently. All the requirements were met, including avoiding of excessive attrition to product during processing. Series of tests were conducted immediately after startup to determine optimum motor speed to obtain this result.

(Stainless steel vertical mixer was produced by Sprout, Waldron and Company, Inc., 130 Logan Street, Muncy, Pennsylvania.)

Check 2713 opposite last page.

Check 2712 opposite last page

Operator places drum on hoist which will dump contents into blender (rear). Material is received, blended, and bagged with minimum labor



Photos by CP Staff

Process areas for drying and blending cellulose acetate pellets were not suitable for a two-level, gravity-feed system. Nevertheless, tall top-feed dryers are served with minimum of labor as . . .

## Skip hoists smooth material handling at Celanese

**THEODORE W. WETT**, Associate Editor  
with **C. A. GRAPEL**, Project Engineer  
Celanese Corporation of America, Newark, N.J.



Dumpers handle drums weighing up to 500 lb. Units permit all material handling to be done on one level

**Problem:** Rapidly expanding demand for Celanese cellulose acetate led to a consolidation of processing equipment and close scrutiny of material handling methods at company's Newark plant. Particular attention was given to handling of pellets going into dryers and blenders. Existing gravity-feed systems were not satisfactory for revised equipment arrangement.

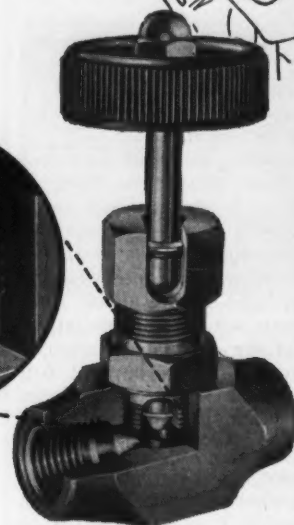
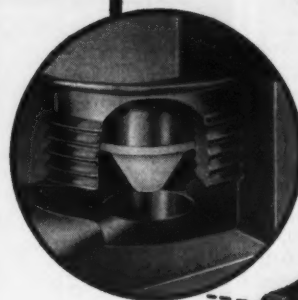
Dryer's construction places charging opening 15 to 20 feet above the floor. Each unit handles from 7000 to 10,000 lb of product per 24-hr day. Product to be dried is received at street level and discharged from dryers at same level. Blenders are set up similarly.

**Solution:** Equipment was consolidated in 1952. To feed pellets to dryers and blenders, a number of Cesco skip hoist dumpers were placed in service. Units range in height from 16 to 24 ft.

Dumpers handle drums weighing up to 500 lb, approximately two ft in diameter and three ft high. Units lift by cable and drum powered by a herringbone-worm-

## PROCESS ENGINEERS . . .

here's a  
money-saving  
tip



on  
small valves

You can stop worrying about heavy-handed operators ruining the stem points and seats on your small valves when you install Hoke's new 270 Series bar stock valves with plastic pointed stems. Let them "tighten down" all they want, because these long-wearing nylon or corrosion-resistant Kel-F tips have taken 700 cycles of operation at 3500 psi using twice the normal closing force—and the valve did not leak across the seat. They'll save you money three ways—cutting valve replacement, down-time and maintenance.

Use this new Hoke valve for vapor or vacuum leak-tight closure, in service up to 5000 psi. It also minimizes opening pressure surges, and meets applicable MIL specs for use on high pressure compressors. Available in 1/4" or 1/2" sizes, globe or angle pattern, with O-ring or Teflon packing. All valves can be panel-mounted.

Complete information  
is yours on request.  
Write us today.

*Why buy big  
when you can buy small*



**Hoke Incorporated**  
FLUID CONTROL SPECIALISTS  
45 Piermont Road  
Cresskill, N.J.

Check 2714 opposite last page



## NEW SOLUTIONS

gear brake motor. Three-button control switch—up, down, and stop—acts instantly. Magnetic brake prevents coasting. Automatic geared limit switch assures a smooth easy stop at top and bottom.

All mechanical devices are totally enclosed in safety guards. As an added precaution, safety cages are used. Drum cannot be elevated until man has left the cage and door is closed.

**Results:** Material handling has been simplified. Flow of material is smooth and uninterrupted since all handling can be done on a single level.

Maintenance on dumpers has been light despite almost continuous use since installation. Units are adequately powered to handle loads required (up to 500 lb). There has been negligible motor or drive trouble.

(Cesco skip hoist dumpers are a product of Essex Conveyors, Inc., 165 Franklin Ave., Nutley 10, New Jersey.)

Check 2715 opposite last page.

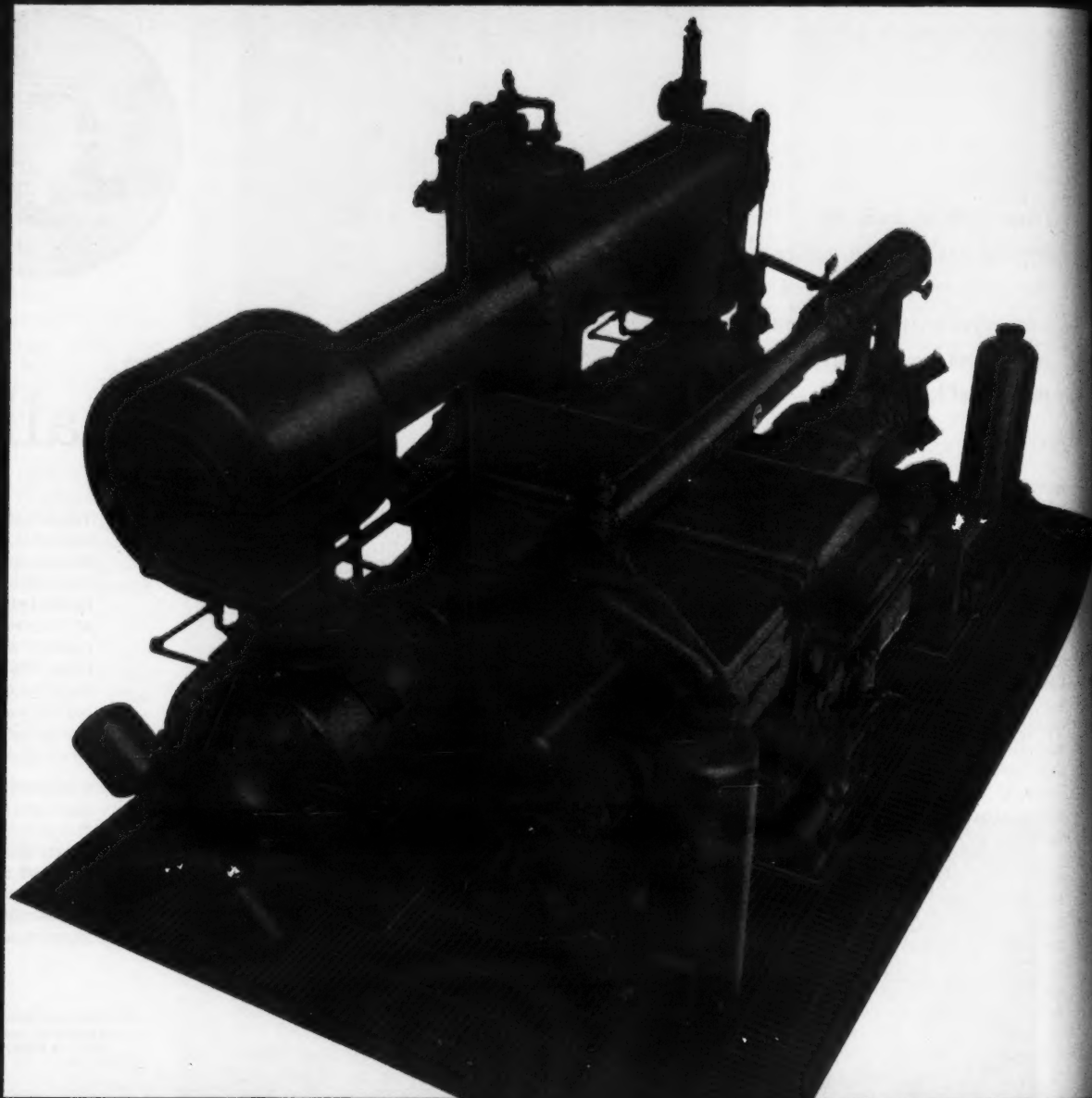
### **Maintains check on oil in boiler feedwater**

**Problem:** On several occasions the Paulsboro, N.J., refinery of Socony Mobil Oil Company, had trouble with boilers due to oil contamination of feedwater from return steam condensate. Oil promotes foaming and causes extra boiler maintenance during shutdowns. Additional cleaning is necessary to remove oil from tubes as it causes fouling and decreases heat transfer. If oil were to get over into turbo-generator, serious damage could result.

In spite of disadvantage of possible oil contamination, it is important to use the 500 gpm of steam condensate available. Savings in water means a great deal, particularly during periods of water shortage.

An oil removal system was installed. Steam condensate, coming from various refinery operations, is first passed through a skimmer (baffled settling tank) to remove oil from top and bottom. Water

# CLASS FE FOR PROCESS WORK



2000 HP four stage, Class FE-44 compressor

# COMPRESSORS

## NEW SOLUTIONS

The Class FE Compressor is one of several types available for process work. Readily adaptable in single and multi stage designs for low or high pressure service, these balanced opposed compressors require a minimum of attendance and insure maximum availability.

- ★ Suitable for direct motor drive or gear drive
- ★ In sizes to 5,000 horsepower
- ★ For pressures to 15,000 pounds or vacuum service

Photo 1111 by A. L. J. Class FE 55 compressor

then passes to a deoiling leaf-type filter, designed to remove last residue of oil.

Although oil removal system has worked very well, it is still possible for oil to enter feedwater system during peri-



C P Staff Photo

Meter on colorimeter gives a measure of oil content of water

ods of temporary overloads. A good method for measuring oil content of steam condensate going to boilers was necessary. No more than 7 ppm oil could be tolerated in boiler feedwater. It is desirable to keep oil content below 1 ppm.

Previously, plant took samples of purified steam condensate and observed them visually. Visual observation of overflow cup was also used. A light beam was tried at one



C P Staff Photo

Colorimeter sensing element, amplifier, and sampling setup at Socony Mobil

time to assist in observation. Steam vapors interfered with the operation of one instrument tried. A better method of measuring oil content of return steam condensate was required. None of methods tried was satisfactory.

**Solution:** In October 1956, a flow colorimeter was installed for monitoring oil content of return steam condensate. Assembly is composed of color sensing element, ampli-

  
**Chicago Pneumatic**

8 East 44th Street, New York 17, N. Y.

AIR AND GAS COMPRESSORS • VACUUM PUMPS • PNEUMATIC TOOLS • MECHANICAL TOOLS • DIESEL ENGINES • ROCK DRILLS • HYDRAULIC TOOLS

Check 2716 opposite last page

fier, and potentiometer recorder. Color sensing element consists of a sample cell one centimeter in depth, light source, and a phototube.

A portion of steam condensate flows continuously through cell, which is located between light and phototube, proportionately reducing amount of light energy falling on tube.

Signal from phototube, which is proportional to amount of light transmitted through sample, is recorded as percent transmittance. Recording is measure of oil present in water.

**Results:** Plant now has a better check on trouble. Several times a slug of oil in steam condensate has been observed in time by the operator, and the contaminated water run to the sewer. Flow colorimeter plays an important part in preventive boiler maintenance.

(Flow colorimeter is product of Process Instruments Div., Beckman Instruments, Inc., 2500 Fullerton Rd., Fullerton, California.)

Check 2717 opposite last page.

#### **Carbide paper slitters give ten times longer life**

**Problem:** At Lee Paper Company, Vicksburg, Michigan, steel slitters used on underside of paper winding machines lasted only two to three months before requiring regrounding.

Normal replacement of bottom slitters took from ½ to 1 hour. Entire driving shaft had to be disconnected from drive, jacked up and out of the journal. Slitter-roll holding bolt was then loosened and slitters removed from shaft end to be replaced by new ones. This loss in machine time was expensive.

Also, operation of steel slitting knives on top against the steel slitters on bottom dulled knives rather quickly. Mid-shift shutdowns were necessary to replace knives if substandard paper was to be avoided. Occasionally, small

## **SPECIFICATION: Alcoa Aluminum**

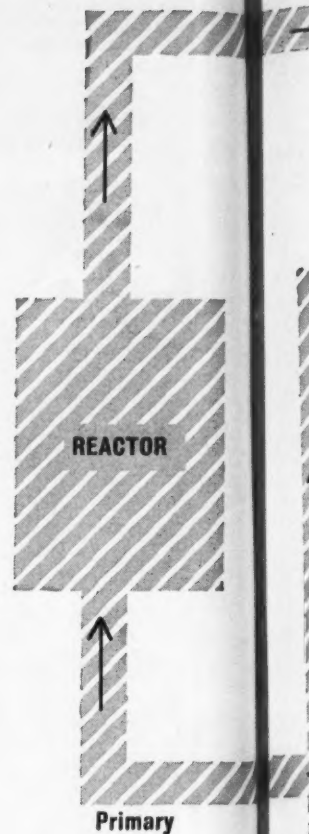
**CHARACTERISTICS: low cost • minimum metal  
pick-up • short half life • special resistance  
to CO<sub>2</sub> • no color imparted • nontoxic •  
contributes no iron or copper contamination**

High purity water itself represents an appreciable investment. Protection of that investment requires a special combination of characteristics in the metal used to contain high purity water. Aluminum provides those properties at a cost far lower than that of other metals which might be used. That's why more and more ALCOA® Aluminum is being specified today for handling high purity water in such varied applications as these: reactor cooling systems in nuclear power plants . . . condensate handling in both nuclear and orthodox power generation systems . . . pharmaceutical manufacturing . . . television picture tube manufacturing . . . and a variety of laboratory systems where high purity water must be stored or circulated.

The outstanding corrosion resistance of aluminum insures minimum metal pick-up—important to maintaining water purity at the highest possible level. Aluminum's special resistance to CO<sub>2</sub> makes it ideal for storing or handling boiler condensate. It imparts no color to the water it contains. It is nontoxic. And aluminum's short half-life makes it an ideal material for atomic reactor applications (see flow chart).

In addition to all this, aluminum combines light weight with great strength in alloys. It has excellent thermal conductivity . . . is non-magnetic and nonsparking . . . is highly workable and lends itself to a variety of welding or brazing techniques for sound, easy fabrication. And, again, aluminum provides all these assets at the lowest cost.

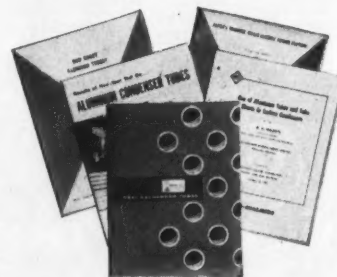
If you work with high purity water, it will pay you to discover more about the ways you can use aluminum to make your systems work best, most economically. ALCOA's development engineers have had many years' experience working with aluminum in nearly every type of high purity water storage and distribution system. Their experience is at your disposal. Simply write Alcoa, describing the requirements of your system, in order to receive all available technical data and performance information. Address ALUMINUM COMPANY OF AMERICA, 902-M Alcoa Building, Pittsburgh 19, Pennsylvania.



**ALCOA THEATRE**  
Fine Entertainment  
ALTERNATE MONDAY EVENINGS



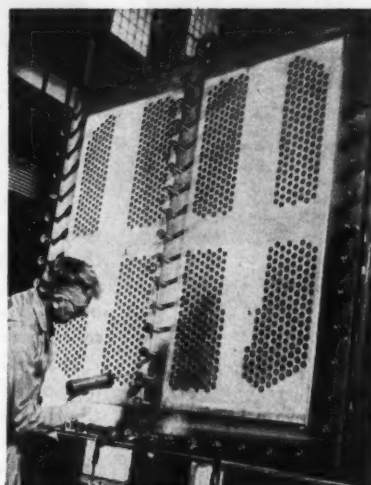
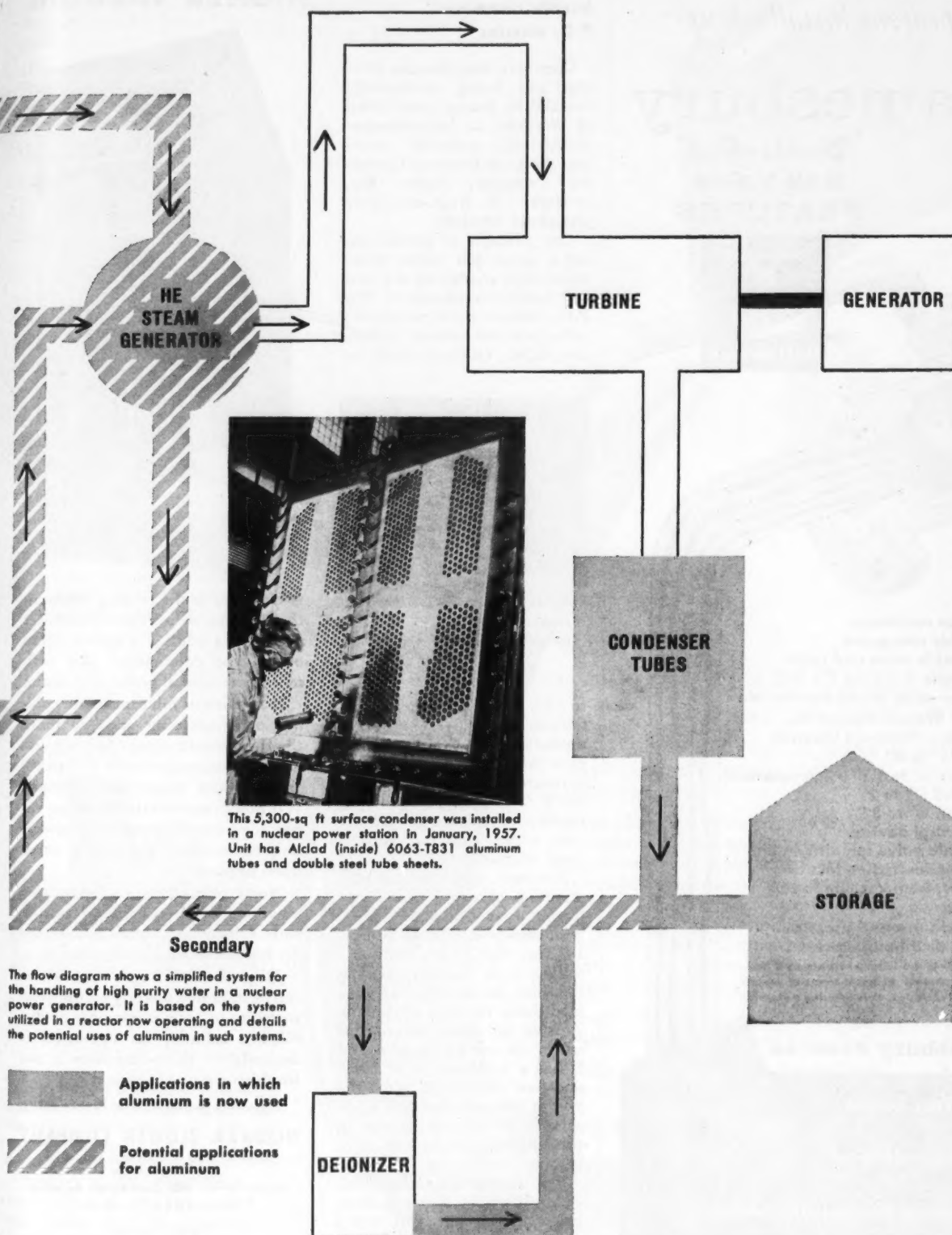
**SEND FOR THIS FREE LITERATURE.** Alcoa will be happy to send you this comprehensive set of literature related to the use of aluminum in high purity water systems. Included are several papers from Conferences of the National Association of Corrosion Engineers, a five-year service report on an aluminum condenser tube installation and other technical data. You can obtain this data promptly by writing Alcoa at the address given above.





# for high purity water systems

NEW SOLUTIONS



This 5,300-sq ft surface condenser was installed in a nuclear power station in January, 1957. Unit has Alclad (inside) 6063-T831 aluminum tubes and double steel tube sheets.

pieces of steel would break off and become imbedded in the paper.

**Solution:** In 1956 six steel slitters on underside of each of the three paper machines were replaced with slitters made of Carboloy cemented tungsten carbide. Six steel slitting knives on upper side of each machine were retained.

As the paper races through the winder at speeds ranging from 1200 to 2000 spm, it is cut into strips by the shearing action of the steel knives against the bottom slitters of the unit.

**Results:** Carbide bottom slitters have been in service for two years with still no



Paper rolls through slitters at 13 to 23 miles per hour

signs of visible wear — about ten times as long a life so far as was obtained previously. No machine downtime has been necessary for maintenance on the bottom slitters since they were installed.

With the steel upper knives being continually operated against the carbide bottom slitters, there is a constant honing action that keeps a sharper cutting edge on the knives. Chipping of the steel knives has been cut to a minimum. It is estimated that the steel knives have at least 50% longer life before they need resharping.

Cutting-dust has been materially decreased, helping to maintain the high quality of the fine paper produced.

(Carboloy cemented carbide is manufactured by Metallurgical Products Department, General Electric Company, Detroit 32, Michigan.)

Check 2719 opposite last page.

Check 2718 opposite last page

## HOW TO KNOW WHOSE VALVE YOU NEED...

for specifying on new equipment  
replacing on present installations

Check these

# Jamesbury

## "Double-Seal" Ball Valve FEATURES



- Two sealing surfaces
- Quarter turn on-off operation
- Minimum maintenance
- No lubrication
- Highest chemical and corrosion resistance
- Handles widest range of liquids and gases
- Replaceable and interchangeable seats and seals
- Standard design and dimensions
- Built-in abrasion resistance—extr along service life
- Wide selection of materials — Bronze, Aluminum, Stainless and Carbon Steels — Polyvinyl Chloride
- Size range depth— Pipe sizes ¼" to 8"  
Tubing sizes ¼" to 1½" (High pressure)
- Choice of styles — Screwed end ¼" to 2"  
Flanged end ½" to 8"
- Easily adapted for remote control devices
- Design permits repacking while valve remains on line
- High-flow capacity with minimum friction loss
- Positive shut-off — no leakage, from vacuum to full rated pressure. Low torque
- Self-compensating for temperature and pressure.
- Readily available from local distributor stock

Jamesbury "Double-Seal"™ Ball Valves are ideal wherever zero leakage is an important requirement. The absence of metal-to-metal contact of working parts eliminates galling and corrosion, thus assuring extensive and reliable service.

### Double-Check Jamesbury Features:

- ☐ Send for descriptive "At Your Service" booklet.
- ☐ Write for complete catalog under your company letterhead.
- ☐ Inquire about local Jamesbury Stocking Distributors.

JAMESBURY CORP., 65 NEW STREET, WORCESTER, MASS. 01099

Check 2720 opposite last page

## NEW SOLUTIONS

### Stainless steel pumps handle corrosive P<sub>2</sub>O<sub>5</sub> slurries

Corrosive and abrasive slurries are being successfully handled by pumps constructed of Worthite (a high-chrome-nickel-moly austenitic stainless steel) at Farmers Chemical Company, Joplin, Mo., producer of high-analysis phosphate fertilizer.

One example of pumps doing a good job under these demanding conditions is a unit that handles a solution of 32% P<sub>2</sub>O<sub>5</sub> (phosphorous pentoxide) with dissolved calcium sulfate, free H<sub>2</sub>SO<sub>4</sub> (sulfuric acid), up



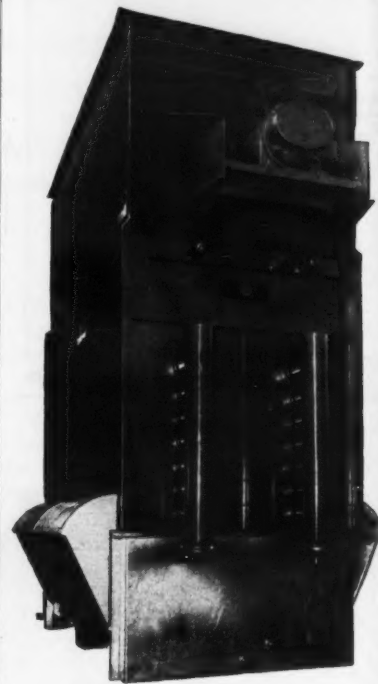
Area superintendent checks two pumps which handle phosphoric acid

to 3% hydrofluosilicic acid, fluosilicates, and traces of hydrofluoric. The flow rate is 80 gpm and the average temperature of the mixture is 104°F. This pump has been in continuous service for almost four years with no replacement of parts.

Another example is the pumping of a gypsum slurry having a solution of 32% P<sub>2</sub>O<sub>5</sub> with dissolved calcium sulfate, 1% free H<sub>2</sub>SO<sub>4</sub>, 3% hydrofluosilicic acid, fluosilicates, and fluorides, handled by two filter feed units. Because of its high gypsum and silica content, this slurry is extremely abrasive. It has a temperature of 158°F and flow rate of 480 gpm. The two to two-and-one-half years service life of components in this difficult processing stage is very satisfactory.

The austenitic stainless steel, called Worthite, of which these pumps are constructed, has a nominal composition of 24% nickel, 20% chromium, 3.25% silicon, and 3% molybdenum.

## This AIR-COOLED CONDENSER produces a HIGHER VACUUM



• Using air as the cooling medium, the Niagara Aero Vapor Condenser produces a higher vacuum than other type condensers, and with more economy of power and steam.

It sustains its full capacity in cooling or condensing with no more than a nominal cooling water requirement, eliminating entirely your problems of water supply and disposal.

It holds constant the liquid or vapor temperature producing always uniform products and giving maximum production.

Non-condensibles are effectively separated at the condensate outlet, with sub-cooling, after separation for higher vacuum pump efficiency.

Niagara Aero Vapor Condenser can be mounted directly on the steel structure of your evaporator or distillation column. Its operation is dependable; its maintenance is not troublesome or expensive.

For more information write for Bulletin 129R

### NIAGARA BLOWER COMPANY

Over 35 years of Service in Industrial Air Engineering

Dept. CP-12, 405 Lexington Avenue  
NEW YORK 17, N. Y.

District Engineers  
in Principal Cities of U. S. and Canada

Check 2721 opposite last page

CHEMICAL PROCESSING

## NEW SOLUTIONS

Its mechanical properties are similar to those of the best chromium-nickel stainless steels.

(Pumps constructed of Worthite® are product of the Worthington Corporation, Harrison, N. J.)

Check 2722 opposite last page.

(Information courtesy of International Nickel Co., Inc., 67 Wall St., New York 5, New York.)

### Two blowers solve unloading problem, end work hazard

**Problem:** Unloading granulated cork via conveyor was slow process and an occupational hazard to workmen at Ebco Manufacturing Company, Columbus, Ohio, because of danger of breathing in dust. Fire hazard also existed in storage room because of dust. Conveyor dropped material at fixed point, resulting in unevenness of distribution with consequent space loss.

**Solution:** Installation of two heavy-duty air blowers improved handling and storing of



Heavy-duty air blower on plant roof serves dual purpose

cork. Negative air pressure on one blower replaced conveyor for moving cork from hopper into which 50-pound bags are emptied. Movable nozzle employed on discharge end distributes material evenly.

Second blower, installed on roof, exhausts air from storage room through a water-spray scrubber, under constant negative pressure.

**Results:** Reduction of 66 2/3



## NO COMPROMISE WITH QUALITY in Flexitallic Spiral-Wound Gaskets

There are shorter ways — quicker ways — to make gaskets, but there's only one Flexitallic way.

Each Flexitallic Spiral-Wound Gasket is made to meet a specific sealing requirement. The flange design and the bolt load determine the density of the gasket — compression response is directly related to service. And then, with the most exacting mechanical controls, each Flexitallic Gasket conforms to specification.

**Result:** the right gasket for the right flange, to make the proper seal.

In the severest service — thermal and physical shock, corrosion, vibration,

and unpredictable joint stresses — the Flexitallic Spiral-Wound construction compresses like a spring and then rebounds when the bolt load is relaxed.

For genuine Flexitallic Gaskets, look for Flexitallic Blue—the blue dye in the Canadian asbestos filler. It identifies the Spiral-Wound construction pioneered by Flexitallic in 1912.

**FLEXITALLIC GASKET CO.**  
8th & Bailey Sts. Camden 2, N. J.

*Flexitallic*  
**SPIRAL-WOUND GASKETS**

**FOR PIPE FLANGES, PRESSURE VESSELS AND PROCESS EQUIPMENT**

\*Flexitallic is a registered tradename. No one else can make a Flexitallic Gasket. Look for Flexitallic Blue — it's our exclusive blue-dyed Canadian asbestos filler.

Check 2723 opposite last page



## NEW SOLUTIONS

per cent in unloading time achieved, from maximum of 24 manhours to minimum of 8 manhours per carload. This was accomplished because fewer men were needed to unload cork and they did not have to wait on conveyor to carry material to storage room. All dust is removed so that air is now dust-free and workmen no longer need wear nasal dust protectors.

Occupational hazard is removed, and time previously spent in changing protectors saved. Movable nozzle permits stockpiling of 40 per cent more insulating material in storage room. Dust disposed of eliminates acute fire hazard in storage room.

By operating in clean air outside exhaust line, movable parts of blowers are not affected by dust, abrasive or corrosive materials handled.

(Heavy-duty blowers were supplied by Quickdraft Corp., PO Box 87, Canton 1, Ohio.)

Check 2724 opposite last page.

### Elastomer-coated rack resists corrosive acids 400 hr at 205°F

A coating using Kel-F fluorocarbon polymer as the base material plays an important part in construction of an improved general purpose anodizing rack recently made available by Automotive Rubber Company, Inc., Detroit, Michigan. The polymer coating makes the anodizing rack completely corrosion resistant as compared to other coatings which have a very short life for this use.

In a test run, the rack was immersed in a solution of 85% by weight of 85% phosphoric acid and 15% by weight of 67% nitric acid for 400 hr at 205°F. The rack coating showed no deterioration.

This compound is also completely inert to practically all other corrosive chemicals used in the anodizing process.

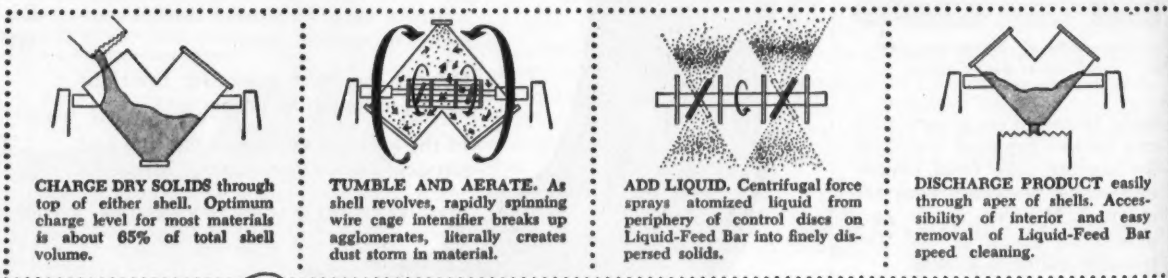
Coating is made from Kel-F plastic and other materials to form the compound called AR-9025. This material can be molded around the main con-

P-K "Twin-Shell" Liquid-Solids Blender easily and thoroughly disperses as little as 0.1% by weight of any liquid in dry solids. "Twin-Shell" does it in 15 minutes!

# Blend

100 lbs. fine powder  
and 8 oz. liquid  
... in 15 minutes!

With the P-K "Twin-Shell" Blender the process industries can eliminate such post-blending operations as pulverizing and screening, with their time-consuming materials handling. Blending time itself is cut from hours to minutes. And some hitherto impossible blends are achieved easily with the P-K "Twin-Shell." Here's how "Twin-Shell's" unique design speeds processing:



See this new concept in blending! Accept this invitation... ➡ ➡

## Get new ideas for your blending process at P-K's Pre-Test Lab

Phone Stroudsburg 820 and arrange  
to make comparison tests — using  
your own formulations — at  
P-K's Pre-Test Lab.

P-K makes practically all kinds of blenders — conventional types as well as the radically different "Twin-Shell." Thus, P-K can give you impartial help in selecting the correct blending process for your needs.

But, blending is full of variables; don't decide on *any* blending equipment or process until you pre-test it with your own formulations. The Pre-Test Lab offers you an opportunity to do this with the aid of skilled blending technicians and proper equipment ... and without obligation, of course.

You simply bring or send your materials to the Lab. Here the correct blending procedure and equipment for *your* job are determined by extensive tests. You receive a comprehensive report that can become the basis for an informed selection.

# You're invited

to pre-test your own formulations at the Pre-Test Lab. Write — or better yet, phone — Russell Dotter at P-K to set a date. (The number: Stroudsburg 820.) He will tell you how much of your materials to bring and will give you other details.

If you can't spare the time, send your materials anyway. But try to see the tests for yourself. If your process includes precision blending, your visit will be worth your while. The Patterson-Kelley Co., Inc., 1812 Hanson St., East Stroudsburg, Pa. (in the heart of Pennsylvania's scenic Pocono Mountains).

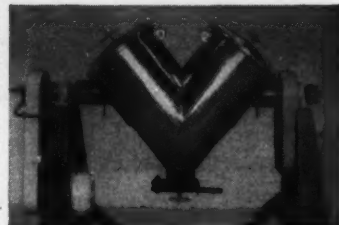
P-K Process Executive welcomes visitor to Pre-Test Lab at East Stroudsburg, Pa. Lab is equipped and staffed to make, or help you make, conclusive tests of blenders with your own materials.



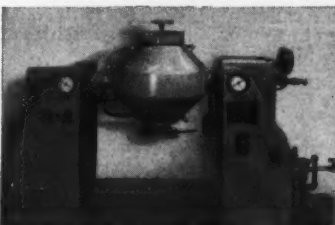
### TEST YOUR MIX WITH EQUIPMENT LIKE THIS



"Twin-Shell" Liquid-Solids laboratory models are made in transparent Lucite or stainless steel, in 8 and 16 quart sizes.



Production models of the "Twin-Shell" blender range up to 50 cu. ft. capacity. (Intensifier and Liquid-Feed Bar optional.)



Vacuum Tumble Dryers by Patterson-Kelley are available in sizes down to the standard 1 cu. ft. capacity lab model.



Production models of the Vacuum Tumble Dryers have capacities up to 150 cu. ft. Come factory aligned, piped, instrumented.

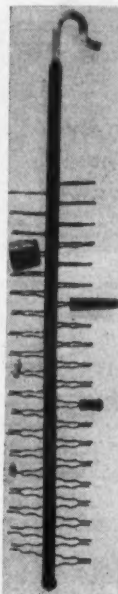
**Patterson Kelley**  
Chemical and Process Division

Check 2725 opposite last page

ductor or spline in a 300 ton hydraulic press. Coating is  $\frac{1}{8}$ " thick.

Spline can be either copper or aluminum, either of which assures adequate electrical conduction to within a few inches of part to be anodized.

Transition from spline to part is bridged with titanium rod adaptors (see photo). Rods



Metal spline of anodizing rack is encased in polymer coating which protects it from mixed phosphoric acid and nitric acid at 205°F

are driven into spline with a broaching-type action. This excellent contact is important because of the high electrical resistivity of titanium. A pre-molded collar of AR-9025 is slipped over titanium rod and butted against spline coating as a safeguard against leakage of acid through joint.

(Kel-F polymer is product of Minnesota Mining & Mfg. Co., 900 Bush Ave., St. Paul 6, Minnesota.)

Check 2726 opposite last page.

Liquid heating systems utilizing tetra-aryl silicate as heat transfer medium are detailed in 13-page, loose-leaf bound brochure. Included are technical data sheets on a number of TAS grades for various temperature ranges. Advantages and application suggestions are tabulated. "Hydrotherm TAS Liquid Heat Systems" — American Hydrotherm Corp., 10-55 Jackson Ave., Long Island City 1, N.Y.

Check 2727 opposite last page.

Where can this **FLEXIBLE**, clear, plastic tubing  
fit into your plans?

# TYGON

✓ If you convey  
corrosive gases  
and liquids.

✓ If you convey liquid  
food products.

✓ If you require  
flexible lines with  
solution visibility.



Chemically-resistant, non-toxic, supple as a fly line, Tygon clear flexible plastic tubing is the ideal medium for those tough-to-solve piping problems.

Possessing a flex life ten to twelve times that of rubber, free of aging characteristics, Tygon serves equally well as a permanent component in machines or as quickly assembled and disassembled, temporary or permanent plant piping.

Plastics &  
Synthetics  
Division

**U. S. STONEWARE**

AKRON 9, OHIO

## QUICK FACTS

Six standard formulations to meet a wide range of requirements.

Special formulations for unusual needs.

More than 50 standard sizes ranging from 1/16" to 3" ID.

Available if desired with outer braid reinforcement for pressures up to 300 psi.

### THIS FREE BOOK TELLS THE COMPLETE STORY

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Dept. MM

Plastics and Synthetics Division  
The U. S. Stoneware Co.,  
Akron 9, Ohio  
Ask for Bulletin T-97



353-E

## NEW SOLUTIONS



### Giant conical blender . . .

. . . in service at Edmonton Works of Canadian Industries Limited has 17½ feet diam and is used for cross-blending polyethylene in 30-ton batches. Huge unit was chosen because it fitted in with batch size normally handled in processing operation. Stainless steel is used on all surfaces contacting material.

(ThoroBlender is manufactured by The Patterson Foundry and Machine Company, East Liverpool, Ohio.)

Check 2729 opposite last page.

### Temperature of resin kept at 200-250°C with strip heaters

**Problem:** If resins stored in kettles at Neville Chemical Company, Pittsburgh, Pa., dropped too low in temperature, material would solidify. If this happened, resin couldn't be transferred out of vessel without heating it in some way. If vessel were overheated or heated non-uniformly, resin might char and impair product quality.

**Solution:** Plant has adopted a system of using a number of electrical strip heaters on outside bottom of each resin kettle. Strip heater consists of a nickel-chromium alloy resistor embedded in a refractory. Refractory is compacted to maximum density with hydraulic pressure and then fired in a furnace at elevated temperatures.

Heaters in use under kettles at Neville are 500 to 1000

Check 2728 opposite last page



# U.S.I. CHEMICAL NEWS

★ A Series for Chemists and Executives of the Solvents and Chemical Consuming Industries ★

## Methods for Making Borane Fuels Now Being Piloted

Operation of a high-energy-fuel pilot plant for the Air Force began recently at AFN, Inc., Henderson, Nevada. The company is owned jointly by American Potash, Food Machinery, and the U.S.I. Division of National Distillers (see U.S.I. Chemical News—February 1958).

This new plant is a process development unit designed, engineered and constructed by AFN under Air Force sponsorship to develop a large-scale production method for alkyl borane high energy fuels, materials of great importance to the nation's missile program.

### ATTENTION:

### Users of Specially Denatured Alcohol

Citric acid may now be added to toilet preparations containing tartar emetic to prevent clouding, according to an industry circular issued by the Alcohol and Tobacco Tax Division.

Since issuing the regulation that tartar emetic or sucrose octa-acetate must be added to bay rum, alcoholado, or alcoholado-type toilet waters made with specially denatured alcohol, the Division has discovered that tartar emetic produces cloudiness in formulations.

The Division recommends the use of one-quarter grain of citric acid per fluid ounce of finished product to eliminate cloudiness. The circular says: "Permittees now holding approved formulas for the manufacture of alcoholado or bay rum containing tartar emetic and who elect to add citric acid... need not submit new formulas on Form 1479-A. However, formulas submitted in future for these products in which citric acid is to be used must show such use."

## Cetyl Alcohol "Blanket" Lowers Water Evaporation

Researchers have discovered that a one-molecule-thick layer of cetyl alcohol, spread on the surface of water in a reservoir, can reduce evaporation by as much as 65%. A pound of this harmless chemical will cover 10 acres of surface and last about 3 days against the action of wind and dirt. It is calculated that a pound per acre per month provides adequate protection, and that millions of dollars could be saved this way yearly in areas where water is usually in short supply.

Cetyl alcohol acts by spreading over the water surface to seal out air. It must extend to the reservoir banks to be effective. Its self-healing property insures that there will be no uncovered places on the surface for long, should wind or dirt break the coating.

Some practical problems must be solved before usage can become widespread. These include methods of applying and replacing the chemical. One solution being examined involves placing pelletized cetyl alcohol in screens on floats or buoys on the water.

## Tests Confirm That Methionine Is Absorbed Through the Skin

### Known Healing Properties of Methionine, Plus Proof Of Skin Absorption, Suggest Wide Application in Topically Applied Cosmetics, Toiletries, Medications

It has been established by thorough study that methionine is absorbed by the body when applied to the skin. Radioactive tracer studies made with guinea

pigs reveal that administration of methionine by skin has nearly half the efficiency of oral feeding.

Methionine is an essential sulfur amino acid, a precursor of cystine in the skin, hair, nails and other tissues. It has been shown previously that methionine administered orally:

- decreases healing time of surface wounds
- cures some forms of diaper rash
- aids in disappearance of warts
- protects against radiation damage
- helps reduce tumor growth
- overcomes urinary infections

Experience with topical application has revealed that methionine:

- promotes rapid healing of burns and other wounds
- heals varicose leg ulcers
- promotes good skin tone
- has helped in treatment of falling hair

Now that definite experimental data has been compiled on the rate and extent of methionine absorption through the skin, it is felt that its healing properties can be utilized

**MORE**

### Esters of ISOSEBACIC® Acid Compare Well with Other Vinyl Plasticizers

Octyl esters of the new U.S.I. ISOSEBACIC acid have been evaluated against accepted vinyl plasticizers in a complete series of tests at the U.S.I. laboratories. The performance results have been coupled with current price information to yield comparisons which should be of interest to makers of vinyl plasticizers.

Here are the conclusions. Octyl isosebacates are less expensive than sebacates and are closely competitive in overall performance. They have an edge over azelates on cost and are about equal in performance. While comparing closely on cost with adipates, they are better on overall performance.

ISOSEBACIC acid is a new synthetic intermediate developed by U.S.I. — a mixture of 2-ethyl suberic, 2, 5-diethyl adipic and sebacic acids. It will soon be available commercially from a new U.S.I. plant at Tuscola, Ill.



Uptake of methionine ( $S^{35}$ ) in hair of rubbed guinea pigs. (Edwards, L. J.: *Nature*, 173, 1042)

# U.S.I. CHEMICAL NEWS

## CONTINUED

## Methionine

extensively by formulators of cosmetics, toiletries and topically applied medications. Creams and lotions to maintain skin tone, treat burns and sunburn, and hasten the healing of minor cuts, scratches and abrasions are among the possibilities. Incorporation into baby talcs, after-shave lotions and men's hair preparations is also indicated. The possibilities are many.

### Test Procedures

Here's how the tests were made. Methionine labeled with a radioactive sulfur ( $S^{35}$ ) tracer was applied in aqueous solution to a shaved area on the backs of the test guinea pigs by gentle rubbing. The same solution was also injected intramuscularly into a second group of guinea pigs, and fed orally to a third group. Hair from the treated animals was clipped at weekly intervals, washed, and its radioactivity determined. The per cent of absorption by these three methods of application were, respectively, 1%, 3.5%, and 2%, based upon the test results.

The animals subjected to topical application were treated four days a week for four weeks. Their hair showed a steady build-up of radioactivity during this time. When application was stopped, radioactivity declined steadily. The chart on the preceding page shows the curve.

## New Surface Treatment for Polyethylene Makes It Receptive to Printing Ink

A new chemical treatment for giving the surface of polyethylene an affinity for printing inks is outlined in British Patent 772,803. Two types of chemical solutions are mentioned:

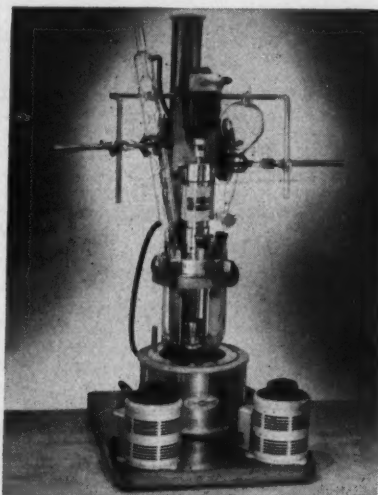
(1) A 4% aqueous solution of a permanganate containing 10-30% by weight of sulfuric acid. A brown permanganate stain results which can be removed with potassium bisulfite without affecting film's receptiveness to ink.

(2) A 30% aqueous solution of a chromate or dichromate containing not more than 30% by weight of sulfuric acid. Both chemical treatments are followed by washing and drying.

## New High-Speed Stirrer For Dispersing Sodium

A new unit, designed to apply high-speed stirring to many types of small-scale chemical reactions, has been tested and found satisfactory for dispersing sodium. As part of a research program on preparation and uses of sodium in dispersed form, the U.S.I. laboratories have evaluated the new Chemtor Dispersion Reactor and have found that it compares favorably with other small-scale units suggested in the U.S.I. literature (see the 42-page U.S.I. brochure "Sodium Dispersions" for complete discussions of Cowles Dissolver, Premier Mill Dispenser, Waring Blender).

The Chemtor Dispersion Reactor, like the others, can be used to increase the surface area of sodium—for faster reactions and higher yields—in Claisen condensations, Wurtz-type reactions, purifications, metallations, preparation of sodium alcoholates, preparation of alkyl and aryl sodium, polymerizations and replacement of acidic hydrogen.



Chemtor high-speed dispersion reactor system.

## TECHNICAL DEVELOPMENTS

Information about manufacturers of these items may be obtained by writing U.S.I.

**Powdered replacement for liquid acids** just introduced is blend of acid salts, activators, surfactants. Acid solutions prepared by dissolving in water. Suggested for activating metals before plating, and as pickling agent. **No. 1410**

**Barium chloranilate reagent powder** for sulfate determinations is now being marketed. Reduces working time to one half hour maximum, it is claimed. Suitable for analyses of water, petroleum products, many other materials. **No. 1411**

**New gamma-sensitive scintillation detector** is specially designed for medical diagnostic use of radioisotopes. Is said to be ideally suited for thyroid or kidney function studies, cardiac output determinations, 3-D body scanning. **No. 1412**

**Feed industry outlook for next 50 years**—covers expected advances in farm economics, biochemical developments, feed automation, liquid supplements, etc. in reprint form. **No. 1413**

**New rauwolfia alkaloid raubasine** is now available in commercial quantity. Product is also known as ajmalicine, delta-yohimbine and tetrahydroserpentine. **No. 1414**

**High purity 2-butene and 1-butene concentrates** are now commercially available. The 2-butene contains no isobutylene, 0.5% max. 1-butene, 1% max. butadiene, 96% min. 2-butene, balance n-butane. The 1-butene contains 5% max. isobutylene, 60% min. 1-butene, balance butanes. **No. 1415**

**Disposable-paper temperature indicators** for 100, 105, 110°F can now be obtained. Work by irreversible color change. Developed for measuring temperatures attained by heat-sensitive biologicals, etc. in storage and transit. **No. 1416**

**Cholesterol's chemistry, biochemistry and pathology** are detailed in a new, 542-page book which can now be purchased. Prepared by an international group of authors, book gives complete picture of present knowledge on compound. **No. 1417**

**Small-capacity pump or meter** designed to fit conventional laboratory stirring motor drives is now on market. Mounts on same ring stand as such motors. Said to handle small flows of Chemical liquids, slurries, pastes. **No. 1418**

**Proceedings of Sixth International Conference on Spectroscopy** (May 1956) have recently been published as a supplement to Spectrochimica Acta, 1957 and offered for sale. Includes papers on UV absorption, IR spectroscopy, emission, spectrometry. **No. 1419**

## PRODUCTS OF U.S.I.

**Pharmaceutical Products:** DL-Methionine, N-Acetyl-DL-Methionine, Urethan USP, Riboflavin USP, Intermediates.

**Alcohols:** Ethyl (pure and all denatured formulas); Proprietary Denatured Alcohol Solvents SOLOX®, FILMEX®, ANSOL® M, ANSOL PR.

**Organic Solvents and Intermediates:** Normal Butyl Alcohol, Amyl Alcohol, Fusel Oil, Ethyl Acetate, Normal Butyl Acetate, Diethyl Carbonate, DIATOL®, Diethyl Oxalate, Ethyl Ether, Acetone, Acetoacetanilide, Acetoacet-Ortho-Chloranilide, Acetoacet-Ortho-Toluidide, Ethyl Acetoacetate, Ethyl Benzoylacetate, Ethyl Chloroformate, Ethylene, Ethyl Sodium Oxalacetate, Sodium Ethylate, ISOSEBACIC® Acid, Sebacic Acid, Urethan U.S.P. (Ethyl Carbamate), Riboflavin U.S.P., Pelargonic Acid, 2-Ethyl Heptanoic Acid.

**Heavy Chemicals:** Anhydrous Ammonia, Ammonium Nitrate, Nitric Acid, Nitrogen Fertilizer Solutions, Phosphatic Fertilizer Solution, Sulfuric Acid, Caustic Soda, Chlorine, Metallic Sodium, Sodium Peroxide, Sodium Sulfite, Sodium Sulfate.

**PETROTHENE® Polyethylene Resins**

**Animal Feed Products:** Antibiotic Feed Supplements, BHT Products (Antioxidant), Calcium Pantothenate, Choline Chloride, CURBAY B-G®, Special Liquid CURBAY, VACATONE®, Menadione (Vitamin K<sub>3</sub>), DL-Methionine, MOREA® Premix, Niacin USP, Riboflavin Products, Special Mixes, U.S.I. Permadry, Vitamin B<sub>12</sub> Feed Supplements, Vitamin D<sub>3</sub>, Vitamin E Products, Vitamin E and BHT Products.

## U.S.I. SALES OFFICES

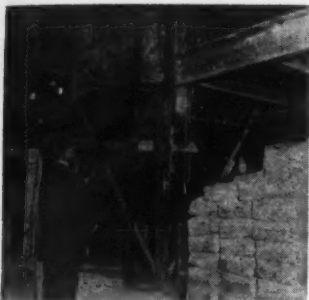
Atlanta • Baltimore • Boston • Buffalo • Chicago • Cincinnati  
Cleveland • Dallas • Detroit • Houston • Indianapolis • Kansas City, Mo.  
Los Angeles • Louisville • Minneapolis • Nashville • New Orleans  
New York • Philadelphia • Pittsburgh • Portland, Ore. • St. Louis  
Salt Lake City • San Francisco • Seattle

**U.S.I. INDUSTRIAL CHEMICALS CO.**

Division of National Distillers and Chemical Corporation  
99 Park Avenue, New York 16, N. Y.



watts and use 230 line voltage. Plant uses 18 to 24 of these strip heaters under each kettle. Total number of strip heaters under kettles is 272. Kettles vary in capacity from 3500 to 10,000 gal.



CP Staff Photo

Strip heaters are located below vessel in circular enclosed area

**Results:** Strip heaters do a good job of maintaining temperature of resin in kettles at 200-250°C. Avoidance of underheating or overheating helps to maintain the high quality of the product.

A minimum of maintenance has been required on heaters. Some have given excellent service for a number of years. Latest ones were installed in February of this year.

(Chromalox electric strip heaters are product of Edwin L. Wiegand Co., 7500 Thomas Blvd., Pittsburgh 8, Pa.)

Check 2730 opposite last page.

### Frequent repacking halted by rotary shaft seal

Abrasive process liquor successfully contained

**Problem:** Packing in a pump handling an organic acid which crystallized at 270°F failed frequently. Midwest chemical manufacturer had to repack pump at least once a day as process liquor froze or crystallized along shaft sleeve

For more information on product at left, specify 2731... see information request blank opposite last page.

# Trapping Standardization

... steam trap standardization plus standardized hook-ups spell lower maintenance costs

An important weapon in the fight against rising maintenance costs is standardization. It can reduce the variety of maintenance problems and simplify those which remain.

Since we specialize in steam traps we'd like to offer some suggestions for a trapping standardization program. Such a program involves standardization on one make of trap and standardization of hook-ups.

## Trap Standardization

The advantages of standardizing on a single make of trap are important and can make a big difference in the cost and ease of repairs because—

1. You can carry a more complete stock of repair parts with a smaller inventory.

2. Maintenance personnel has the opportunity to become expert on one make rather than be "jacks of all traps."

3. As an exclusive user of one make of traps you become a preferred customer of your trap representative and can be sure of getting the best possible service.

4. You can enjoy the advantages of standardized hook-ups.

## Standardized Hook-ups

Standardized hook-ups facilitate and reduce the cost of both original installation and maintenance. By adopting standards for the dimensions of all fittings, including nipples, each hook-up for a given size of trap is identical and can be fabricated in the pipe shop.

Unions should be used so that when a trap needs repair, the unions can be uncoupled, the trap lifted from the line and a spare carrying identical length nipples and half unions slipped into place. In as little as a minute or two a faulty trap can be replaced. The faulty trap can go back to the storeroom for repair when convenient and then be put into stock as a spare.

Figure 1 shows a typical standardized hook-up used by a major chemical manufacturer. Note how

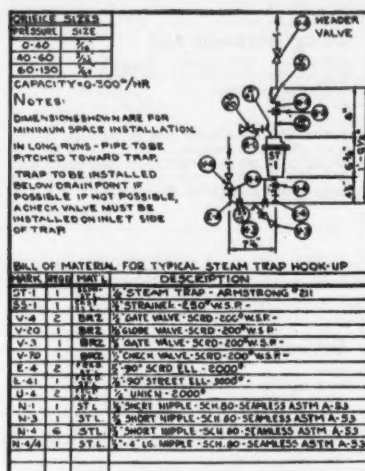


Fig. 1—Typical standardized installation hook-up used by a leading chemical manufacturer.

the hook-up provides the following advantages:

1. Test valve in trap cap permits fast, easy checking of trap operation.
2. Strainer ahead of trap protects it against dirt and scale.
3. Blowdown valve in strainer provides easy cleaning.
4. Check valve in discharge line isolates trap when test valve is opened.
5. Shut-off valves and unions



Fig. 2—Armstrong traps have only two moving parts—the lever assembly and the bucket. Nothing much to go wrong here.

ahead of and following trap permit removal of entire trap from line.

Another important consideration for getting the most from a standardization program is accessibility of the traps. Insofar as is possible, traps should be located so that they are convenient for inspection. The easier it is to locate and get at a trap, the less likelihood that it will be overlooked.

## What Make of Trap? (This is the Commercial)

Obviously, a trap standardization program shows the best results when the make of trap selected is the one that gives the best service. Naturally, we think the make should be Armstrong and fortunately a lot of trap users agree. Here are some of the advantages of standardizing on Armstrong that have been pointed out by these users:

1. *Armstrong traps work.* They don't leak steam and they do discharge condensate and air as fast as they reach the trap. And they work with any return system.

2. *Armstrong traps aren't "prima donnas."* They need no special care or coddling. Valve and seat are hardened chrome steel. Lever assembly and bucket are stainless steel and these are the only moving parts.

3. *Armstrong traps aren't "orphans."* You can always get parts and service from nearby Factory Representatives and stocking distributors.

4. *Armstrong traps are guaranteed.* If you're not completely satisfied you can return the traps for refund of purchase price.

## More Information

The 44-page Steam Trap Book (free on request) gives a lot more facts on trap selection and installation. Call your local Armstrong Representative or write **Armstrong Machine Works, 8803 Maple St., Three Rivers, Michigan.**

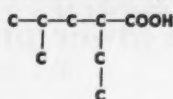


**ARMSTRONG  
STEAM TRAPS**

Check 2732 opposite last page



Eastman  
presents  
some new  
chemicals  
for  
"scientific fiddling"



**2-Ethylisohexanoic Acid**

Form	liquid
S. G. 20/20°C	0.9036
Boiling Point, 738mm.	216-223.7°C
Acid, %	97.9

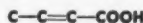
For those who are developing better paint driers, vinyl stabilizers, or plasticizers or who are intrigued with ore extractants, we recommend this branched 8-carbon acid for investigation. Its soaps make interesting gelling agents, too.



**Methacrylonitrile**

Form	liquid
S. G. 20/4°C	0.8001
Boiling Point	90.3°C

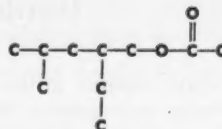
The possibilities here are limited only by the imagination—a vinyl linkage and a cyanide radical on a short molecule.



**Crotonic Acid**

Form	crystalline solid
Crystallization Point	not less than 65°C
Purity	not less than 97%

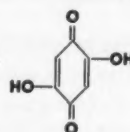
If you're working with alkyls, take a good look at this highly reactive unsaturated acid. Reports are that it makes excellent fast-drying resins. Insecticide chemists have also shown considerable interest.



**2-Ethylisohexyl Acetate**

Form	liquid
S. G. 20°/20°C	0.865-0.870
Boiling Range, 760mm.	186-195°C

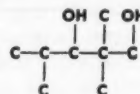
Here's a new ester solvent with a very low evaporation rate and very low water solubility—a valuable combination of properties for multi-color lacquer and emulsion formulations, for instance.



**2,5-Dihydroxybenzoquinone**

Form	solid
Melting Point	216°C (Decomposed)
Quality	Technical grade

From metal chelating to insecticide manufacture anyone interested in quinone compounds will find this one easy to work with—decidedly more stable than most and less irritating to skin and eyes.



**2,2,4-Trimethyl-1,3-pentanediol**

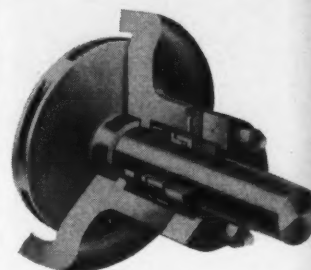
Form	solid
Melting Point	49-51°C
Boiling Point, 4mm.	109-111°C
Purity, Min.	95%

Here's one for chemists delving into synthetic lubricants and lube additives. The unusual configuration of this 8-carbon glycol yields esters with some very unique physical properties.

**NEW SOLUTIONS**

and chewed up the packing. Centrifugal pump has a flooded suction, 55-psig discharge and operates at 3510 rpm.

**Solution:** Packing was replaced by a rotary mechanical shaft seal. Seal is a single inside-type, fabricated of stain-



Shaft seal successfully withstands abrasive action of organic acid crystals

less with a ceramic-faced seal ring. Seal ring rotates against a carbon, non-lubricated insert in a steam heated gland plate. Pump jacket is supplied with 150-psig steam.

**Results:** Mechanical seal has ended company's repacking problem. Unit successfully withstands action of abrasive process liquor to give long, uninterrupted service.

(RO-TT rotary mechanical seal is a product of the Dura-metallic Corporation, Kalamazoo, Mich.)

Check 2734 opposite last page.

**WANTED: NOMOGRAPHS  
— WORTH \$20 EACH!**

Do you have a pet nomograph that could save time for other **CHEMICAL PROCESSING** readers? If so, send it neatly and accurately drawn, with a double spaced, type-written description to:

Data Editor  
**CHEMICAL PROCESSING**  
111 E. Delaware Place  
Chicago 11, Illinois

We will pay \$20 for each one accepted and published.

Several of these chemicals will be available on a commercial scale shortly. We've samples and more data. Your requests for them are welcome.

Call or write to Sales Development Department,  
Chemicals Division, Eastman Chemical Products, Inc.,  
Kingsport, Tennessee

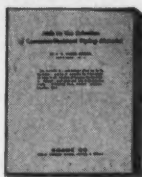
**Eastman**  
CHEMICAL PRODUCTS, INC.  
KINGSPORT, TENNESSEE  
subsidiary of Eastman Kodak Company

Check 2733 opposite last page

## PROCESS PIPING POINTERS

### Aids to Selection of Corrosion-Resistant Piping Materials

You will combat corrosion more effectively with this 2-page technical paper at hand. It discusses questions on important related service factors that are not always obvious... shows with colored "Stop, Caution, and Go" charts the suitability of metals for more than 150 corrosive fluids, based on extensive tests and experience. Ask for publication AD-1703R at no cost. See below.



### Copper-free Ni-Resist valves now regularly available

To accommodate preference of customers, Crane is now using copper-free (Type 2) Ni-Resist for regular production of these widely used, economical corrosion-resistant cast iron gate valves. Approximate composition is 20% nickel, 2% chromium and 0.5% maximum copper. Body and bonnet are Ni-Resist; trim is stainless steel. Sizes up to 12 in. Ask for Circular AD-2047R.

### Y-pattern diaphragm valve is best performer on chlorinated lime solution



Nine years' leak-free, trouble-free performance on chlorinated lime solution has demonstrated to this paper mill that modern diaphragm valves have important advantages over all other valves for this bleach plant service. Read the facts—in the Crane ad on next page.

For literature or data on product listed above, please contact  
J. E. Bradbury, Manager,  
Chemical Sales Dept. No obligation

## CRANE CO.

Gen'l Offices: 836 S. Michigan Ave., Chicago 5  
VALVES • FITTINGS • PIPE  
PLUMBING • HEATING • AIR CONDITIONING  
Branches and Wholesalers Everywhere

Check 2735 opposite last page

DECEMBER 1958



## processing and engineering data

243

## Conversion of Volumetric Flow to Linear Flow

JACK G. LOWENSTEIN

Food Machinery and Chemical Corp.  
Baltimore 3, Md.

An easy method of converting volumetric flow to linear flow is to use the accompanying nomograph which is based on the equation:

$$Q = VA$$

where

$Q$  = flow, cu ft/min

$V$  = velocity, ft/min

$A$  = area, sq ft

Instead of an area scale, a diameter scale has been substituted, eliminating that conversion.

It should be noted that both actual inside diameter and nominal pipe sizes are given; in the latter case, nominal size refers to schedule 40 steel pipe.

For convenience, the linear flow or velocity

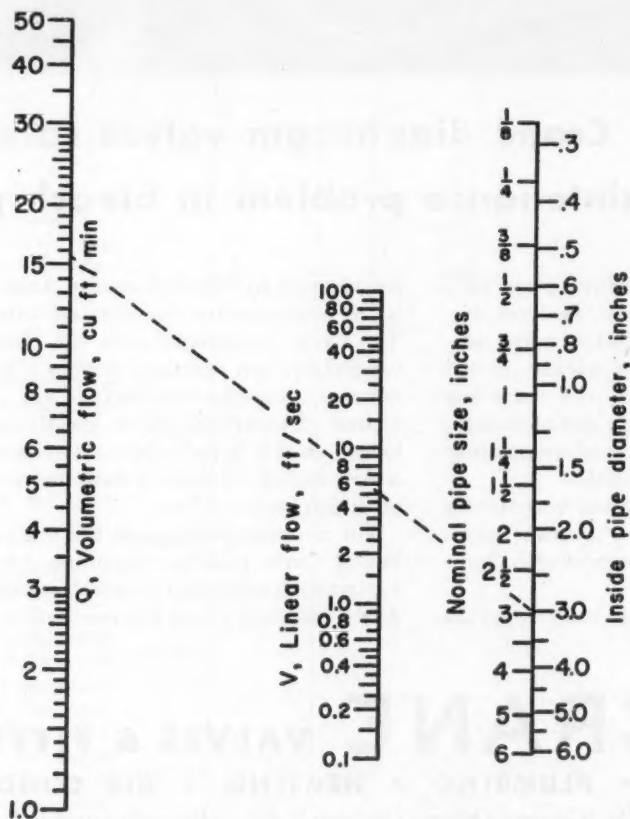
scale is graduated in ft/sec, since velocity is more commonly expressed in these units.

### TYPICAL EXAMPLE

To use, connect the two known variables with a straight line and read the answer where this line intersects the third variable scale.

For example, volumetric flow of a gas having velocity of 5.0 ft/sec through a 3-in nominal diameter pipe is found to be 15.4 cu ft/min on the  $Q$  scale.

Mathematical computation yields the same answer.





## Crane diaphragm valves solve maintenance problem in bleach plant

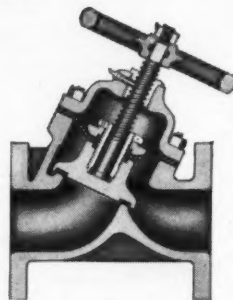
Nine years ago, in this midwest paper mill, a 2-inch Crane iron-body, packless diaphragm valve was installed on a line handling a chlorinated lime solution in the bleach plant. Ever since, this valve has been in daily use without a sign of leakage. It still operates as easily—and seats tightly—as the day it was installed.

Impressed by the operating record of this first valve, the mill has a program for replacing all cocks on this service with Crane diaphragm valves.

Working parts of these Crane valves are

not exposed to corrosive-erosive fluids as in the plug-type and conventional valves. The Crane diaphragm seals the bonnet completely, and functions *only* as a bonnet seal. Sticking and leakage are prevented. Diaphragm life is greatly prolonged since it is not subject to crushing, severe flexing—and early rupture—as in other diaphragm valves.

For complete facts about the complete line of Crane packless diaphragm valves for handling ordinary or corrosive process fluids, ask your Crane Representative.



Crane packless diaphragm valves are made in a wide variety of body materials, including choice of diaphragm, disc insert and optional body lining. Sizes: 1/2 to 14 in.—with screwed or flanged ends.

# CRANE VALVES & FITTINGS

PIPE • PLUMBING • HEATING • AIR CONDITIONING

Since 1855—Crane Co., General Offices: Chicago 5, Ill.—Branches and Wholesalers Serving All Areas

Check 2736 opposite last page

## NEW SOLUTIONS

### Polyethylene film proves its worth in bleachery

Serves as a room divider, also covers vats, skids

Triple benefits are being realized through use of polyethylene film at Lowell Bleachery, Inc., St. Louis, Missouri. As a room divider, film serves as temperature barrier between Sanforizing room, where temperatures are kept at 140°F, and an adjacent work area. In addition to blocking the heat, the clear film transmits light, making use of additional lighting fixtures near barrier unnecessary.

Because the material is unaffected by strong bleaches, it is used as a vat covering during bleaching operations. Film prevents evaporation of the



Used as skid covers, polyethylene film does excellent job of protecting fabrics from dust, moisture at bleachery

expensive bleaching chemicals and eliminates possibility of discoloration of fabrics only partially submerged near surface of vat.

To protect fabrics in storage from high humidity and dust, polyethylene is also used as skid covers. Lowell finds that the film offers excellent protection to all fabrics. The material's low cost and reusability provides company with economical means of solving or avoiding many of the problems inherent in bleachery operations.

(Durethane polyethylene film is product of the Plastics Division, Koppers Company, Inc., Pittsburgh 19, Pennsylvania.)

Check 2737 opposite last page.



# HOMOGENIZING



## New Tricks for old blends with Gaulin "PARTICLE CONTROL"

Get the jump on costs and quality! See what a Gaulin Homogenizer or Colloid Mill can do for you . . .

- Pharmaceuticals: more uniform, stable and finer emulsions.
- Grease: increases penetration value and uniformity.

• Cosmetics: produces smoother textures, longer shelf-life, locks-in fragrance.

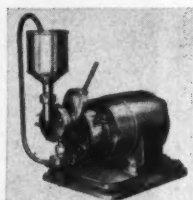
• Wax Emulsions: less emulsifying agent required, increases stability.

• Pigments: produces continuous, high capacity dispersions to finest possible particle size.

Try Homogenizing your product. Send a sample or rent Laboratory Homogenizer for only \$75.00 a month. Gaulin Technical Assistance will help you bring new cost-saving solutions to processing operations.



Homogenizer Bulletin H-55  
Sub-Micron Dispenser  
Bulletin SMD-55



Colloid Mill Bulletin C-57  
Laboratory Homogenizer  
Bulletin LH-55



Manton-Gaulin Manufacturing Co., Inc.

55 Garden Street, Everett 49, Mass.

World's largest manufacturers of high pressure pumps, homogenizers and colloid mills.

Check 2738 opposite last page

DECEMBER 1958



## processing and engineering data

244

## Thermal Conductivity of Insulating Materials

R. R. DIXON

Westinghouse Electric Corporation

Box 2199

Columbus 16, Ohio

In measuring thermal conductivity of insulating materials, a convenient method is to use two one-in thick samples of insulation, one on each side of a guarded hotplate.

The equation that relates the variables is:

$$k = \frac{ql}{A\theta\Delta t}$$

where

k = thermal conductivity

q = heat transferred through insulator

l = thickness of insulator

A = effective area of hot-plate

$\theta$  = time during which q is measured

$\Delta t$  = temperature drop across insulator.

Since heat is most easily measured by a wattmeter, the  $q/\theta$  term appears as Q, the wattage input.

In using the method described above for conducting such a test, controlled temperature cold plates are placed on the other faces of the insulation samples.

When input to maintain a constant hotplate temperature is Q watts, the thickness of the insulation is l cm, the effective area of the hot plate is A sq in, and the difference in temperatures of hot and cold plates is  $\Delta t$  °F, the equation becomes

$$k = \frac{48.43 Ql}{A\Delta t}$$

Nomograph was constructed for temperature differences of 96° to 104°F, a convenient and practical range. The heat input and the plate area were combined in Q/A as watts per sq in, because the area term is constant for each

piece of equipment and the only variable is the wattage input.

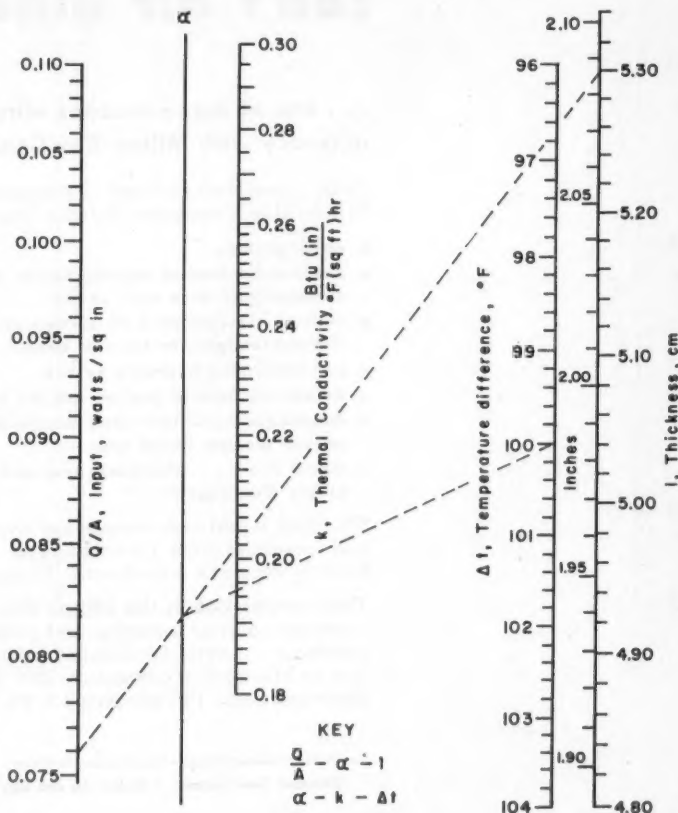
For a specific size of hot-plate, the Q/A scale can easily be converted to be used directly in watts.

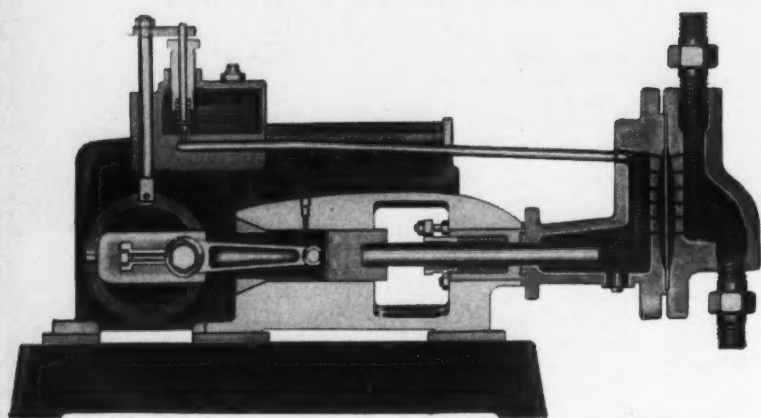
Also incorporated into the nomograph are constants that convert input in watts into Btu/hr (which flow through each one-in piece of insulation), area of plate from sq in to sq ft, and overall insulation thickness into average thickness of each piece. Value

of k then has units of Btu (inch)/°F (sq ft) hr.

### Typical Example

Example operation shown is for insulation of 5.30 cm total thickness and a heat input of 0.076 watts/sq in. Intersection of this connecting line with the index line  $\alpha$  is then connected to temperature drop across the insulation (100°F). This latter intersection on the k line is at 0.195 Btu (inches)/°F (sq ft) hr.





## This diaphragm pump can't air bind



... one of many reasons why you get reliability and accuracy with Milton Roy Controlled Volume Diaphragm Pumps

Take a good look at these outstanding features of the new Milton Roy Controlled Volume Diaphragm Pump:

- no air pockets.
- positive mechanical valving bleeds air or vapor from hydraulic fluid automatically once each stroke.
- uniform pressure on both suction and discharge . . . diaphragms move without tendency to twist or bend.
- non-lubricating hydraulic system . . . fluid can be water, or other liquid.
- no moving parts to beat air into the hydraulic fluid.
- diaphragm liquid ends interchangeable in the field with Milton Roy packed plunger liquid ends.
- monel fillers . . . effectively seal and prevent cold flow of the plastic diaphragm.

Standard liquid end designs are available for pressures to 1,000 psi and capacities from 1.1 to 138 gph . . . manual or automatic 0-100% capacity adjustment. Higher capacities available.

Take another look at the Milton Roy approach to your metering and pumping problems . . . write for detailed information to Milton Roy Company, 1300 East Mermaid Lane, Philadelphia 18, Pa.

Controlled Volume Pumps • Quantichem Analyzers  
Chemical Feed Systems • Anders Air and Gas Dryers



Check 2739 opposite last page

## NEW SOLUTIONS

### Handles slick clay mud without difficulty

Feeds at maximum efficiency  
with minimum attention

**Problem:** In the original design of a roasting furnace at the Chemical Manufacturing div., Eastman Kodak Company, it was necessary to select a chemical-type feeder which would satisfactorily handle silver-bearing mud. This difficult-to-handle material is a sticky, pasty sludge having a consistency similar to very slick clay mud. It consists of silver salts, organic materials, film and paper chips, and water.

As part of the process to effect silver recovery from waste materials, the roasting furnace is used to dry and burn off organic materials from the silver-bearing muds.

**Solution:** A volumetric-type feeder was installed to discharge mud to the multiple-hearth furnace. As batches of mud are dropped into the feeder, it discharges the material in the range of 200 to 500



Volumetric-type feeder handles slick, clay-type mud satisfactorily, requires little attention

lb per hr, and at a size sufficiently small to promote efficient roasting.

Feeder unit is 2' 6" x 3' 0" high and has a 15-cu-ft capacity. It is geared at 0.4 to 1.2 rpm, with provision for changing the speed range to 0.7 to 2.1 rpm. A 1-hp motor operating at 1760 rpm powers the unit.

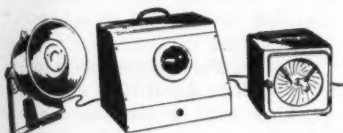
To page 58

## CUT GRINDING COSTS with the "ELECTRIC EAR"®



Control of grinding mill feed based on grinding sound level has long been practiced by experienced mill operators. The Hardinge "Electric Ear" performs automatically the function of a highly experienced operator within much closer limits of accuracy than possible with the human ear. Users of the "Electric Ear" report production increases of from 10 to 20% over best possible manual operation . . .

## ... with NEW Sound-Level Recorder



Available as an "extra" is a sound recorder which keeps a continuous record of grinding mill performance "around the clock."

It indicates operating and shutdown time, and serves as a check on the operator.

It indicates bin conditions, i. e.: bridging or empty bin.

It clearly shows whether the operator has changed the sound level adjustment.

Write for Bulletin AH-480-13.

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Check 2740 opposite last page

DECEMBER 1958



processing and engineering data

245

## Nomograph for Air Changes

PAUL C. ZIEMKE  
408 Highland Drive  
Clinton, Tenn.

An aid in designing ventilation systems, the accompanying nomograph is based on the equation:

$$N = 60S/V$$

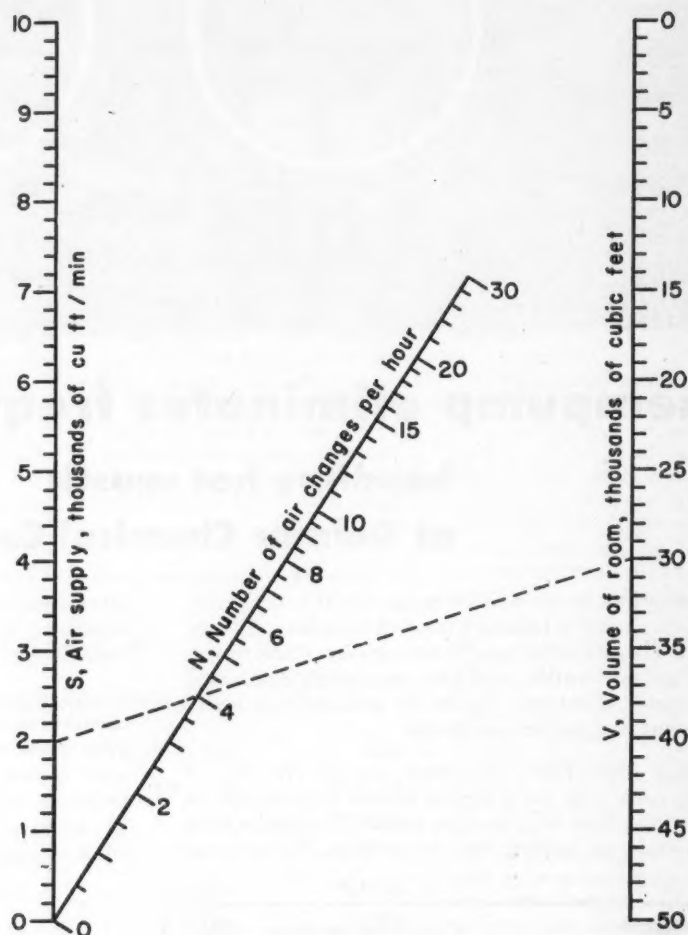
where

N = number of air changes per hr

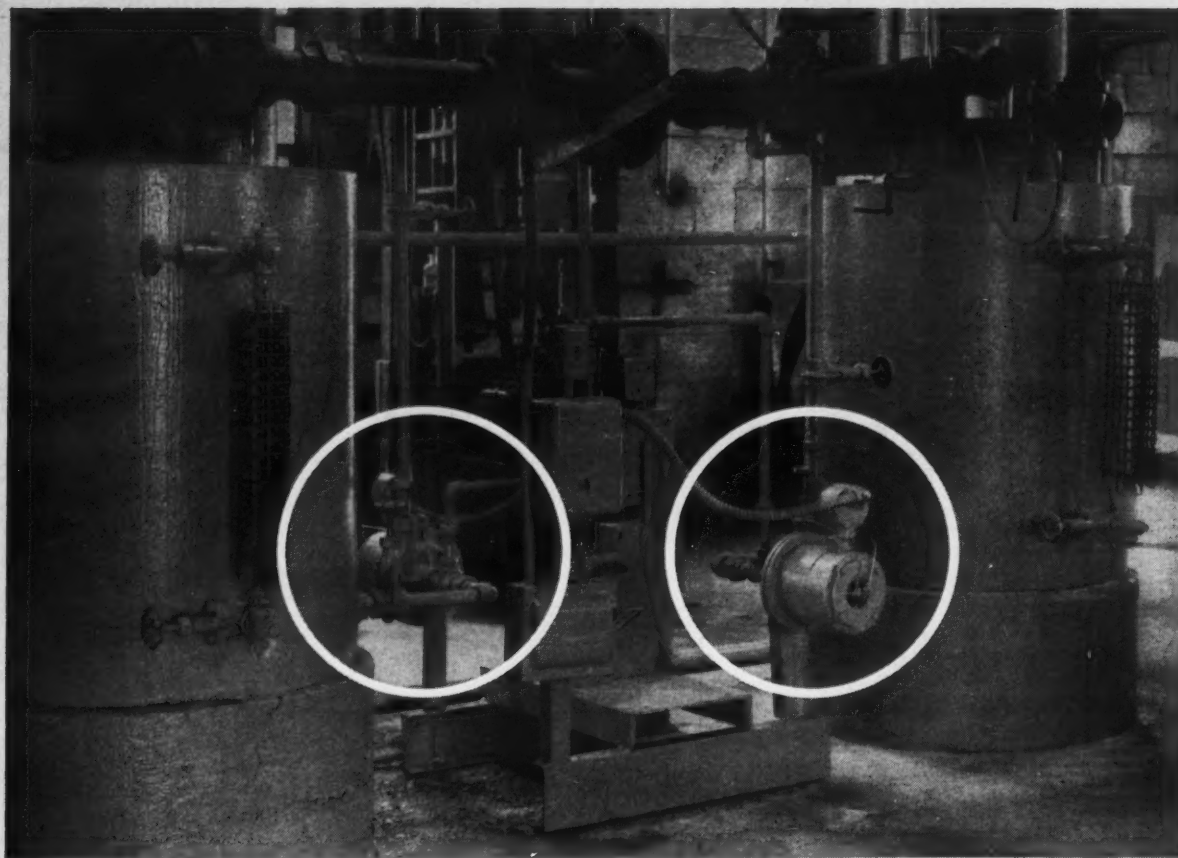
S = air supply, cu ft/min

V = volume of room, cu ft

The index line shows that air supplied at the rate of 2000 cu ft/min will provide 4 changes per hour when the volume of the room is 30,000 cu ft.







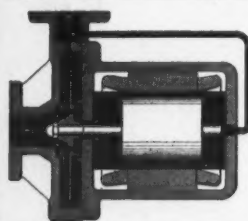
## Chempump eliminates frequent shutdowns handling hot caustic at Delmar Chemical Company

These two *Chempumps* are on the job 24 hours a day, 7 days a week at Delmar Chemical Company, Elkton, Md. They circulate caustic through scrubbing towers for gas purification, and have completely eliminated excessive shutdowns caused by conventional pump stuffing box and seal problems.

These dependable, leakproof pumps are out of operation only for a simple annual replacement of bearings, their only wearing parts. *Chempumps* have no seals, no stuffing box, no packing. No external

lubrication is needed, since bearings are constantly lubricated by the pumped fluid itself. Caustic can't leak out and air cannot enter the pump.

*Chempump* offers many exclusive advantages in any chemical handling application. It would be well worth your while to check them. For details concerning your specific application, write to Chempump Corporation, 1300 E. Mermaid Lane, Philadelphia 18, Pa. Engineering representatives in over 30 principal cities in the United States and Canada.



*Chempump* combines pump and motor in a single, leak-proof unit. No shaft sealing device required.

U.L. approved. Available in a wide choice of materials and head-capacity ranges for handling fluids at temperatures to 1000 F. and pressures to 5000 psi.

**Chempump**

First in the field...process proved

Check 2741 opposite last page

## NEW SOLUTIONS

From page 56

Of mild steel construction, feeder consists of a cylindrical shell mounted concentrically on a vertical shaft by means of spider arms or spokes. Below the cylinder, and mounted on same vertical shaft, is a circular plate larger in diameter than the cylinder.

There is a gap between top of plate and bottom of cylinder. The gap opening may be varied by raising or lowering gap-adjustment ring at bottom of cylinder.

### Plow Strips It Off

Both the cylinder and circular, or discharge, plate revolve. Thus, the entire mass of material held in the cylinder revolves. A stationary plow extends through the gap, just above discharge plate. The plow is designed to continuously strip off bottom layer of material in cylinder as discharge plate, cylinder, and material revolve.

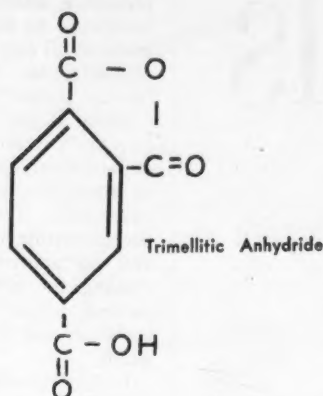
The plow forces a uniform stream of material out of cylinder, converging at point of discharge. Rate of flow is constant, but can be varied by: thickness of plow; height of gap between bottom of cylinder and discharge plate; distance to which plow extends into bin and speed at which bin revolves.

**Results:** Feeder has been in service since April 1958 and is working with a minimum of operator attention and maintenance. It is feeding the difficult-to-handle silver-bearing mud in a very satisfactory manner.

(Com-Bin Feeder is product of Pulva Corporation, 550 High St., Perth Amboy, N.J.)

Check 2742 opposite last page.

Case history bulletin of four-pages is fully-illustrated presentation on material handling techniques being employed in plant resulting in greater output in same amount of manufacturing space. How large vitamin manufacturer was able to increase production and shipping schedules without expanding plant facilities is described in Case History Bul 283-1—Lewis-Shepard Products, Inc., Dept. R8-24, 125 Walnut St., Watertown 72, Mass. Check 2743 opposite last page.



Although rare in the past, this anhydride of 1,2,4-benzene tricarboxylic acid is now available in development quantities for evaluation. Acid-anhydride combination marks this first in a series of new aromatic acids as . . .

## Trifunctional Trimellitic Bids for Resin Berth

**USES:** Preparing alkyd resins, unsaturated polyesters, printing inks, resin intermediates, adhesives, molding resins, plasticizers, dyes, and many other materials.

**Features:** Trimellitic anhydride offers high reactivity, trifunctionality, and an acid-anhydride combination. It will function both as an aromatic acid and as an anhydride. Thus, it can hydrolyze to the acid, triesterify with alcohols, form salts and amides, condense with aromatics in Friedel-Crafts syntheses, or react in a variety of other acid or anhydride capacities.

Structure of the molecule

enables the specific reaction of anhydride group while retaining two carboxyl groups for further reactions. Condensation polymers can then be formed by further esterification with glycols.

### Alkyd Resins

Trifunctionality of trimellitic anhydride means new classes of alkyds. It can be used to produce exceedingly long-oil resins. Trimellitic alkyds may be used in formulating long-oil enamels containing as much as 77-85% oil. At the other extreme, zero-oil-content resins may be prepared.

These show promise in baking finishes.

### Epoxide Resins

Reactions with a large number of epoxides, including ethylene oxide, propylene oxide, styrene oxide, epichlorohydrin, glycidyl methacrylate, and epoxy resins, have been evaluated. Propylene oxide resins can be made containing primarily hydroxyl or carboxyl groups, or both.

Resins which are rich in hydroxyl groups may be esterified with acetic or octanoic acids to produce polymeric plasticizers; with stear-

ic acid to give wax substitutes; with vegetable fatty acids to produce protective coating resins; or with acrylic acid to form unsaturated polyesters.

Resins rich in both carboxyl and hydroxyl groups may be used directly as thermosetting molding compounds or adhesives. They may also be used to modify other resins and polymers.

### Unsaturated Polyesters

Trimellitic can be used in a variety of ways to produce unsaturated polyesters. It can modify conventional phthalic and isophthalic-maleic polyesters. Replacing up to 50% of conventional dibasic aromatic acid or anhydride results in resins with higher heat distortion temperatures and increased flexural strength.

Monooallyl trimellitate can be polymerized with glycols to form polyesters where the reactive group is contained in the branch from the polymer backbone.

Triallyl trimellitate may be used as a cross-linking monomer with conventional polyesters or polymerized to a homopolymer.

### Other Potentials

Trimellitate triesters can be made which are less volatile and contain more ester groups than many esters now used as plasticizers. The offer rapid solvating action typical of

TABLE I

#### Typical Analysis of Trimellitic Anhydride

Purity, % min	99
Melting pt, °C	167-168
Acid No., min	872
(mg KOH/g)	
Anhydride, min %	95
Acid, % max	5
Ash, % max	0.01
Water, % max	0.05
Molten color, max	300
(APHA)	
Bulk density	42
(lb/cu ft)	

TABLE II

#### Properties of Trimellitic

	Anhydride	Acid
Molecular weight	192.12	210.14
Melting point, °C	168	216-8
Solubility 25°C, g/100 g		
Carbon tetrachloride	0.002	0.004
Mineral spirits	0.06	0.03
Mixed xylenes	0.4	0.006
Dimethyl formamide	15.5	31.3
Ethyl acetate	21.6	1.7
Acetone	49.6	7.9
Ethanol	Reacts	25.3
Water	Reacts	2.1

# new industrial chemicals catalog



*Antara offers an expanded and completely revised chemicals catalog.*

*For convenience, it is divided into separate sections devoted to surfactants, organic intermediates, acetylene derivatives, carbonyl iron powders, ethylene oxide and glycols and numerous specialty chemicals, including optical brighteners, ultraviolet light absorbers, etc.*

*The new 64-page catalog describes the composition, properties and uses of Antara products.*

*Fill in and mail the coupon today for your free copy of this valuable reference book.*

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lower molecular weight phthalate esters and the good resistance to soapy water and mineral oil extraction which is characteristic of higher molecular weight esters.

Many of the resins prepared from trimellitic anhydride show unusually good adhesion to glass, aluminum, and other substrates. These resins are thermosetting materials which can be applied as solutions. Among the simplest of these is one prepared from equal moles of anhydride and glycerine.

Like phthalic anhydride, trimellitic can be used to prepare dyes, pigments, and intermediates.

**Description:** Trimellitic anhydride is a white powder available only in development quantities. Produced by oxidizing trialkyl benzenes using manufacturer's unique oxidation process, trimellitic is expected to be produced commercially at a price attractive to chemical process industries. It is the anhydride of 1,2,4-benzene tricarboxylic acid.

Toxicological work with animals shows trimellitic anhydride has no unusually hazardous properties. The acute oral mean lethal dose found (rats) was 5.6 g/Kg.

(Trimellitic anhydride is available in development quantities from Amoco Chemicals Corporation Development Dept., 910 S. Michigan Ave., Chicago 80, Illinois.)

Check 2745 opposite last page.

## Amino acid labeled with carbon-14, deuterium

Labeled with both carbon-14 and deuterium, L-methionine is reported proving useful in studying mechanism of ergosterol. This amino acid is regularly available at a specific gravity of one millicurie per millimole, and is free of both chemical and radiochemical impurities.

(L-Methionine is available from Research Specialties Co., 2005 Hopkins St., Berkeley 7, California.)

Check 2746 opposite last page.

Check 2744 opposite last page



## THAT'S INTERESTING

### Fast dyes kit

Demonstration kit for classroom use, especially for instructing students in how fast dyes are applied to apparel and decorative fabrics, is being offered. Kit is available to home economics departments for \$15 from Vat Dye Institute, Inc., Empire State Bldg., 350 Fifth Ave., New York 1, New York.

### One for the road

To make sure that life you save is your own, make that last one for the road a can of water! Among newest of canned potables, filtered water is being marketed in 12-ounce lithographed cans for the traveler, fisherman, camper, or anyone away from home base and reliable source of drinking water. The cool, clear, non-intoxicating beverage is sold under the "Le Mor" brand label by Pennsylvania Processors, Inc.

For more information on product at right, specify 2747 see information request blank opposite last page.



## GLAD TO BE ABLE TO HELP...

Celanese presents industry with BPL\*—chemical with a wide-open future

Such is the versatility... and potential... of Celanese BPL (beta-Propiolactone) that the scope of its use must be broad indeed. BPL itself can be useful within a wide range of applications. In addition, its rapid reactivity with a large group of other chemicals makes it the starting point for synthesis of many new materials useful to science and industry.

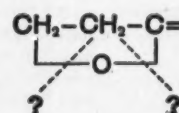
BPL is now being evaluated for use in the

textile and leather industries... as a component in the processing of plastics, paints, dyestuffs and synthetic fibers... in starches and adhesives... in medical and hospital applications... in agricultural and food technology... in nucleonics and astronautics.

Among the multitude of uses yet to be developed, tested, and produced, may be one in which you're interested. As always, we'll be more than happy to help you, if we can.

For further information on Celanese BPL, and/or evaluation samples, just write on your letterhead.

Celanese® BPL™



\*BPL's unique chemical structure gives it "difunctionality"—the ability to react with other chemicals, in two different directions, to produce various important derivatives.

### Basic reasons.....

Acids	Functional Fluids	Polyols
Alcohols	Gasoline Additives	Plasticizers
Aldehydes	Glycols	Salts
Anhydrides	Ketones	Solvents
Esters	Oxides	Vinyl Monomers



### .....for improved products

Agricultural	Paper
Automotive	Pharmaceutical
Aviation	Plastics
Building	Surface Coatings
Electrical	Textiles

CELANESE CORPORATION OF AMERICA, CHEMICAL DIVISION, DEPT. 591-L, 180 MADISON AVE., NEW YORK 16

Export Sales: Amcel Co., Inc., and Pan Amcel Co., Inc., 180 Madison Ave., N. Y. 16. Canadian Affiliate: Canadian Chemical Company Limited, Montreal, Toronto, Vancouver



## Will liquid fluorine launch American satellites bigger than "Sputniks"?

*"Yes!" says major aircraft company in rocket development program. Calls use of liquid fluorine in new rocket engine "last major breakthrough in chemically fueled rockets"!*

Rocket engineers have long known that elemental fluorine held promise of vastly increased thrust for rockets. The problem was to "tame" this terrifically reactive chemical.

As the leading producer of fluorine, General Chemical solved the problem of availability. It created the only privately owned liquid fluorine facilities in the country and developed the method for shipping fluorine as a liquid in "thermos bottle" trailer trucks. This made

fluorine available in bulk quantities for the first time . . . enabled government and industry rocket researchers to expand and intensify development work with this "optimum" oxidizer.

Now the use of fluorine as a high energy propellant is close at hand. Experts forecast that it will enable this country to accomplish difficult space missions, including the launching of satellites substantially larger than the ton-plus "Sputniks."

*First in  
fluorine chemistry*



**GENERAL CHEMICAL DIVISION**  
40 Rector Street, New York 6, N. Y.



## General Chemical now shipping liquid fluorine from extensive new facilities at Metropolis, Illinois

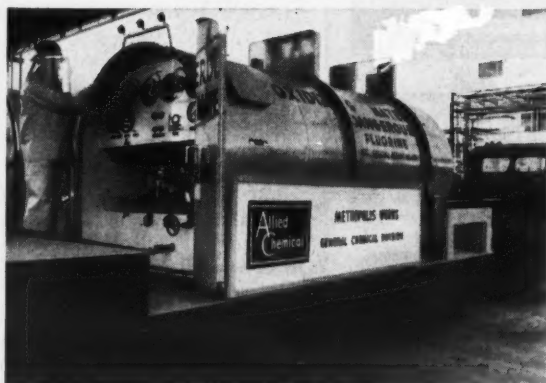
General Chemical is the *sole* supplier of liquid fluorine for America's rocket and missiles program. Tonnage shipments have been made regularly for several years to rocket research centers in various parts of the country from our Baton Rouge, Louisiana, Works. Now they are also going out from extensive new facilities

in full scale production at Metropolis, Illinois.

While most of the fluorine produced at Metropolis will be used to make uranium hexafluoride under an A.E.C. contract, there is sufficient capacity at the plant to supply tonnage quantities of liquid fluorine for the missile development program.



INTERIOR VIEW of General Chemical's new fluorine plant at Metropolis, Ill. Now in full scale production of liquid fluorine, the plant is making tank truck shipments of this high energy oxidizer to rocket research centers working on advanced rocketry programs.



"THERMOS BOTTLE" TANK TRAILERS developed by General Chemical research made possible the shipping and handling of fluorine as a liquid in bulk.



GENERAL'S NEW PLANT AT METROPOLIS, ILL., is scheduled to produce uranium hexafluoride for the Atomic Energy Commission early in 1959. Its fluorine facilities are already in operation.

## CHEMICAL MATERIALS

### Solvent properties Inert character quality diether

**Uses:** Organo-metallic reactions involving metal hydrides or boron derivatives; reductions; isomerization and displacements; cyclic boron-nitrogen reactions; alkylations; and purification of sodium borohydride.

**Features:** Product's solvent properties and its inert character make it an excellent medium for certain reactions.

**Description:** Poly-Solv D2M is a high-boiling, colorless, liquid glycol diether, with the following physical properties:

Sp gr (20/20°C)	0.940-0.960
Boiling range—IBP (°C)	149 min
DP (°C)	165 max
Solubilities (gm/100 gm)	
Water (20°C)	Infinite
Hydrocarbons (20°C)	Infinite
Sodium Borohydride (NaBH <sub>4</sub> ) (40°C)	11.1
Diborane (B <sub>2</sub> H <sub>6</sub> ) (20°C)	0.76

(Poly-Solv D2M is product of The Chemicals Div., Olin Mathieson Chemical Corp., 745 Fifth Ave., New York 22, New York.)

Check 2749 opposite last page.

### Epoxy paste will cure firm and hard under water

**Good adhesion obtained in wet locations**

**Uses:** Patching, filling, or building in wet locations or where water submersion is required.

**Features:** Epoxy paste will cure firm and hard even under water. It will develop good adhesion to clay pipes, concrete, stone, and metals.

**Description:** After addition of hardener, paste may be trowelled or squeegeed into position. Hardening takes place in several hours and unlike usual epoxy formulations, it will become quite hard overnight under moist conditions.

(Epocast 546 is a product of Furane Plastics Corp., 4516 Brazil St., Los Angeles 39, Calif.)

Check 2750 opposite last page.



For better polymers... use Rohm & Haas

# ACRYLIC MONOMERS

The Rohm & Haas acrylic monomers listed below give you the broadest range of acrylic raw materials available. From Rohm & Haas you get not only this wide range of acrylics to help you develop better products, but also information and services on storing and handling the monomers.

The proper acrylic monomer can impart to your polymers or copolymers one or more of these properties:

- Better heat and light stability
- Internal plasticization
- Increased polymerization rate and copolymer yield
- Improved compatibility with other resins
- Stability of emulsions
- Better adhesion properties
- Solubility in alkalies, including ammonia

Polymers of these acrylics can vary in properties from hard, tough solids to semi-liquids, depending upon the monomer used. In copolymerization,

acrylic monomers can be used with vinyl chloride, vinyl acetate, vinylidene chloride, acrylonitrile, butadiene, styrene, and unsaturated polyesters.

Through leadership and long experience in the acrylic field, Rohm & Haas is able to offer sound technical service on the handling of acrylic monomers. This service includes recommendations on transportation, unloading, storage, inhibitor removal, and the design of storage facilities. For complete information about Rohm & Haas acrylic monomers, write to Department SP.



Chemicals for Industry

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COMPANY**

WASHINGTON SQUARE, PHILADELPHIA 5, PA.

Representatives in principal foreign countries



Available in pilot-plant quantities: **DIMETHYLAMINOETHYL METHACRYLATE • METHOXYETHYL ACRYLATE • GLACIAL ACRYLIC ACID • METHACRYLAMIDE**

Check 2751 opposite last page

## CHEMICAL MATERIALS

**Known for 70 years,  
Indene in pure form  
now being offered**

Product 98 percent pure,  
non-polar liquid

**Uses:** As a building block molecule for synthesis of wide range of products. Material has two reactive centers—the double bond and the methylene hydrogen of the five-membered ring—and is a new reactive monomer and basic chemical.

**Features:** First time product has been produced and is available in pure form in semi-commercial quantities although it has been known for 70 years.

**Description:** Of 98 percent purity, indene ( $C_9H_{10}$ ) is an almost water-white, non-polar liquid with boiling point of  $182^\circ\text{C}$ , freezing point of  $-3.5^\circ\text{C}$ , and specific gravity of .993.

It has the general properties of benzene with an unsaturated side chain, thus adding halogens and halogen acids. Material may be oxidized to homophthalic acid, for example, and active methylene group permits condensation with aromatic and aliphatic aldehydes and ketones. One methylene hydrogen also is replaceable with sodium and a Grignard compound may be formed.

(Indene is produced by Neville Chemical Company, Neville Island, Pittsburgh 25, Pennsylvania.)

Check 2752 opposite last page.

**Commercial quantities  
of rare earth metals  
are now available**

**Uses:** Seven rare earth metals now available to give impetus to scientific and technical work in fields of nuclear science and metallurgy.

**Features:** Materials now can be obtained from inventory in commercial quantities.

**Description:** Praesodymium, neodymium, terbium, holmium, thulium, ytterbium, lutetium and other rare earth metals supplement company's

high-purity rare earth oxide products. Metals are cast in ingots 1, 1½, 2, 3 and 3½" in diameter. Special shapes available on custom basis. Purity is 99 plus percent.

(Praesodymium, neodymium, terbium, holmium, thulium, ytterbium and lutetium now in substantial supply from inventory of Michigan Chemical Corporation, St. Louis, Mich.)

Check 2753 opposite last page.

**Expandable polystyrene has self-extinguisher built in**

Material is incorporated right in the bead

**Uses:** For applications requiring self-extinguishing properties in general molding, air conditioning, refrigeration, appliance and panel construction fields.

**Features:** Product has self-extinguishing materials incorporated in bead.

**Description:** Using steam pre-foamers to foam material in place, expandable polystyrene beads change from solids one to one and one-half millimeters in diameter to multi-celled ball many times larger. While foaming, beads take shape of their container.

Beads have good insulation properties and are said to require little cutting and fitting as well as fewer fabrication techniques. Products can weigh as little as one pound per cubic foot with good K factor. Beads are closely knit to provide good moisture barrier. Also, they are structurally sound, provide fabrication flexibility and can be installed easily with adhesives.

(Pelaspan 18 is available in temporarily limited quantities from The Dow Chemical Company, Midland, Mich.)

Check 2754 opposite last page.

For more information on developments reported in this section, check corresponding numbers on Reader Service Slip opposite last page of this issue.

# More REACTIVE

# SOLVAY CAUSTIC POTASH

...produces **MORE SOLUBLE**  
**END PRODUCTS!**

Many users select caustic potash, rather than lower cost caustic soda, because it saponifies fats and grease more readily, and—most important—provides extra efficiency.

Since it is more reactive, the products made from it are also generally more reactive—more soluble, more effective. In fact, many powerful cleaners—including some of the popular heavy-duty liquid detergents—are based on products produced from caustic potash.

We invite you to make your own test of SOLVAY Caustic Potash. Available in two grades—Technical and Mercury Cell—dry forms and liquid, in steel drums and tank cars.

Sodium Nitrite • Potassium Carbonate • Caustic Soda • Chlorine  
Calcium Chloride • Sodium Bicarbonate • Ammonium Chloride  
Caustic Potash • Chloroform • Vinyl Chloride • Methylene Chloride  
Para-dichlorobenzene • Methyl Chloride • Cleaning Compounds  
Hydrogen Peroxide • Aluminum Chloride • Ammonium Bicarbonate  
Soda Ash • Carbon Tetrachloride • Mutual Chromium Chemicals  
Monochlorobenzene • Ortho-dichlorobenzene • Snowflake® Crystals

**SOLVAY dealers and branch offices are located in major centers from coast to coast.**

**Mail now  
for test sample!**



**SOLVAY PROCESS  
DIVISION**

61 Broadway, New York 6, N.Y.

Please send me without cost:

Samples of Technical Grade Caustic Potash

- ☐ Flake ☐ Small Flake ☐ Solid  
☐ Walnut ☐ Liquid, 45% strength  
☐ Liquid, 49-50% strength

Samples of Mercury Cell Caustic Potash

- ☐ Flake ☐ Liquid  
☐ Caustic Potash fact book

DS-12

Name \_\_\_\_\_

Position \_\_\_\_\_

Company \_\_\_\_\_

Phone \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_

Check 2755 opposite last page

News about

# B.F. Goodrich Chemical *raw materials*



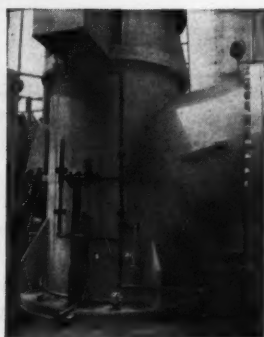
AT FLORIDA POWER & LIGHT'S  
CUTLER GENERATING STATION

## How pipe of Geon helps cut maintenance

The large photo shows 3½" pipe made from Geon rigid vinyl material that is used to feed an aqueous solution of chlorine into sea water just ahead of bar screens at the intake structure. The chlorine prevents buildup of algae in condenser tubes and in the circulating water system.

The smaller photo shows more pipe of Geon circulating salt water to cool the bearings of circulating water pumps. Geon is not affected either by salt water or most chemicals—which proves its value in still another part of this large generating station.

Geon is used to pipe the acid bearing (H<sub>2</sub>SO<sub>4</sub>) wash-down water from the boiler waste hopper to the discharge canal. Geon piping is used also for pumping salt water to the soot disposal collectors.



Geon pipe and conduit also provide high impact and tensile strength. Both are lightweight, easy to install. They are examples of the way that versatile Geon provides the key to new and improved products or applications. For information, write Dept. LJ-12, B.F. Goodrich Chemical Company, 3135 Euclid Avenue, Cleveland 15, Ohio. Cable address: Goodchemco. In Canada: Kitchener, Ontario.



**B.F. Goodrich Chemical Company**  
a division of The B.F. Goodrich Company

**B.F. Goodrich**

GEON polyvinyl materials • HYCAR American rubber and latex  
GOOD-RITE chemicals and plasticizers • HARMON colors

Check 2756 opposite last page

## CHEMICAL MATERIALS

### Black masterbatch for synthetic rubber

Butadiene-styrene copolymer  
shortens mix cycles

**Uses:** Preparation of synthetic rubber products such as tires, wire coatings, or molded mechanical goods.

**Features:** Elimination of dispersing agents and coagulating salts results in a low ash content. Less power is required, shorter mix cycles and greater cleanliness are realized.

**Description:** Synthetic-rubber, carbon-black masterbatch is a butadiene-styrene copolymer rubber, reinforced with an ultra-dispersed carbon black. Non-rubber addition agents have been eliminated and carbon black agglomerates reduced to a minimum.

(Black masterbatch is a product of Texas-U.S. Chemical Company, 260 Madison Avenue, New York 16, N. Y.)

Check 2757 opposite last page.

### Long pot life found in this polyamide for laminating

**Uses:** Polyamide is suitable for adhesive, potting and casting, tooling, and laminating applications.

**Features:** Product has long pot life and a high heat distortion point.

**Description:** Epoxy-reactive polymer has low viscosity. It is designed to improve performance and versatility of Versamid-epoxy combinations.

(Versamid 140 is a product of Chemical Div., General Mills, 9200 Wayzata Blvd., Minneapolis 26, Minn.)

Check 2758 opposite last page.

**Polypropylene** — Commercial applications for manufacturer's polypropylene are included in information contained in 12-page bulletin. Chart lists properties, and information on processing and fabrication is provided. Form 500-302 — Hercules Powder Company, Wilmington 99, Del.

Check 2759 opposite last page.

## CHEMICAL PROCESSING



## THAT'S INTERESTING

### Herm-sealed units

Moisture-resistant fiber drum for hermetically sealed products is easy to handle, costs little to ship. In some cases, container reduces weight by 50%. Initial cost is from 10 to 50% less than previous containers used, depending on size. (Learlog, Lear, Inc.)

### Stratosphere simulated

Walk-in test chamber, fabricated by Acme Welding of West Hartford, Conn., will produce temperatures from 100° below zero to 200° above, humidity from 20 to 90%, and atmospheric pressures simulating flights from sea level to 100,000 ft in 10 minutes.

For testing missile components, chamber fabrication is made possible by application of latest welding techniques. Testing device is 50 ft long and weighs 50,000 lb.

For more information on product at right, specify 2760 see information request blank opposite last page.



### FLATTING

For matte finishes of any desired sheen. Syloids 308, 978, 161, 162, 244 and 72.

### ANTI-BLOCKING

To prevent ink transfer in paper and plastic sheetings. Syloids 308 and 72.

### THICKENING

For non-soap lube and pharmaceutical greases, thixotropic inks, cements, and adhesives. Syloid 244.

### ADHESIVES

To increase the bond strength and improve the consistency of adhesives. Syloids 75 and 244.

### INSULATION

Especially effective for low temperature installations, containers and equipment. Syloid 244.

### MOISTURE REMOVAL

To guard against package failure or product deterioration caused by chemical reaction with H<sub>2</sub>O. Syloid AL-1.

## What will the Syloids do? All this—and more, too!

Today, eleven members of the Syloid® family are available. Each is adaptable to specific industrial applications.

Like people, no two of the eleven Davison Syloid Silicas are exactly alike. Each boasts individual characteristics, such as pH, moisture content, surface area, oil adsorption and density.

Syloid 73, for example, is treated to minimize adsorp-

tion. Syloid AL-1, on the other hand, is designed to take maximum advantage of its high moisture adsorption.

One of the Syloids shown below can help you do one of the jobs shown above better and for less. Which Syloid for which job? On your company letterhead, write for booklet, "The Davison Family of Syloid Silicas," and the name of the distributor nearest you.

**W.R. GRACE & CO.**  
DAVISON CHEMICAL DIVISION  
BALTIMORE 5, MARYLAND



SYLOID AL-1

SYLOID 72

SYLOID 73

SYLOID 75

SYLOID 161

SYLOID 162

SYLOID 244

SYLOID 255

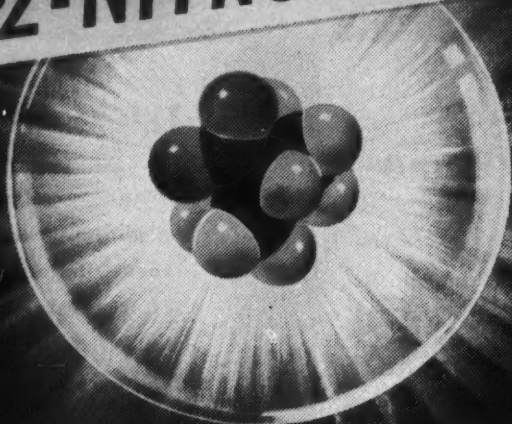
SYLOID 308

SYLOID 404

SYLOID 978

MEDIUM BOILING, MILD ODOR, UNUSUAL SOLVENT POWER.

# CSC 2-NITROPROPANE



## USES

- Medium evaporating solvent in acrylic resin.
- Powerful economical solvent for vinyl acetate and vinyl chloride co-polymers.
- Solvent for nitrocellulose, and cellulose acetate butyrate.
- Preferred solvent in preparation of epoxy resin finishes.

## PROPERTIES: 2-NITROPROPANE $\text{CH}_3\text{CHNO}_2\text{CH}_3$

Molecular Weight	89.09
Specific Gravity at 25/25°C	0.986-0.990
Pounds per U. S. Gal. at 68°F	8.24
Boiling Pt. at 760mm, °C	120.3
Flash Pt., °F (Tag Open Cup)	103.0
Solubility ml per 100 ml:	
Product in Water, 20°C	1.7
Water in Product, 20°C	0.6

## CSC CHEMICALS FOR INDUSTRY

### ALCOHOLS

Methanol Butanol  
Ethyl Alcohol

### AMINES AND AMMONIA

Ammonia, Anhydrous and Aqua  
Ammonium Nitrate, Solid and 83% Sol.  
Methylamines  
Benzyltrimethylammonium Chloride  
Hydroxyethyltrimethylammonium-bicarbonate

### ESTERS

Amyl Acetate Butyl Acetate  
Butyl Lactate Butyl Stearate  
Dibutyl Phthalate Ethyl Acetate  
Tributyl Phosphate

### NITROPARAFFINS

Nitroethane 2-Nitropropane  
Nitromethane 1-Nitropropane  
Alkaterges Diamines  
Aminohydroxy Compounds  
Nitrohydroxy Compounds  
Chloronitroparaffins

### PHARMACEUTICALS, BULK

Bacitracin  
Riboflavin, U.S.P. and U.S.P., R.S.

### OTHER CHEMICALS

Acetone Formaldehyde  
Pentaerythritol

## COMMERCIAL SOLVENTS CORPORATION

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## CHEMICAL MATERIALS



Barriers that have prevented water-thinned paints from being satisfactorily used on previously painted or weathered exterior surfaces now are coming down. A solvent-soluble PVAc emulsion coupled with special formulations may . . .

## Open the door to broader exterior use of polyvinyl-acetate-base paints

**Problem:** One of the principal objections to out-door use of water-thinned paints has been lack of penetration and subsequent loss of adhesion over chalky and dirty surfaces.

Alkyd or oil type exterior paints conventionally used suffer from deficiencies of alkali sensitivity, yellowing due to oxidative degradation, and low water-vapor-transmission rate with resulting tendencies toward blistering. Water-

thinned products on the other hand, have a high rate of vapor transmission or "breathing", resist yellowing, are easy to apply and clean-up.

It remained only to eliminate the problems of peeling, blistering, and scaling caused by lack of penetration to satisfactorily utilize these water-thinned products over previously painted and weathered exterior surfaces. Such a utilization could greatly extend

Check 2761 opposite last page

Superior adhesion of special formula PVAc emulsion paint (left) is demonstrated here in pressure-sensitive-tape test. Conventional water-thinned paint is completely removed from surface when tape is pulled

the out-door use of these easy-to-handle products.

**Solution:** Early this year a polyvinyl acetate copolymer emulsion was incorporated in special formulations of exterior paint in an attempt to overcome this drawback. Characteristic of the emulsion that permitted these unusual formulations was a complete solubility in active solvents such as xylene and toluene. Emulsion polymer is essentially linear with a minimum amount of branching.

Most other PVAc emulsions are only swollen or incompletely dissolved by the solvents.

To next page

#### PVAc Emulsion Paint Formula for Exterior Use

Component	lb
Ethylene glycol	15
Carbitol	10
20% Daxad 11 soln	16
R&R 551	2
Butrol	15
Rutil TiO <sub>2</sub>	225
Anatase TiO <sub>2</sub>	50
Asbestine 3X	36
325 mesh WG mica	50
Water (added by increment during pigment addition)	120

Add in order listed and mix as a heavy paste for a minimum of 20 minutes, then add:

Colloids 581B	2
Water (as needed)	
Disperse on a three-roll mill and let down with:	
2% Methocel soln (4000 cps, 65HG grade)	50
R&R 551	3
Water	20
CL-202 (PVAc emulsion)	356
Toluene	124
Water and/or methocel soln for viscosity adjustment.	

Surprising—the amount of practical, yet little-known, information in this new bulletin . . .



Dicalite materials have such an astonishing variety of uses that even those who use Dicalite seldom realize its full range of applications. Hence, Dicalite properties of great potential value might be unfamiliar to the very men who could employ them best. That's why we are issuing this new bulletin, containing the latest information on Dicalite applications as filler, extender, catalyst carrier, absorbent, conditioning agent and insulation.

Included in Dicalite Bulletin E-41 are complete tables of physical and chemical characteristics of all the Dicalite filler grades. The important known

uses are discussed in some detail, in terms of the advantages given by Dicalite, and other uses are listed. Study of these, we believe, may suggest applications of Dicalite in your own work, either in product improvement or in cost savings. Many applications offer both.

*If your work involves FILLERS, EXTENDERS, ABSORBENTS, ANTI-CAKING AGENTS, DUST DILUENTS or INSULATING MATERIALS, this bulletin is for you. Just use the coupon.*

Dicalite Dept., Great Lakes Carbon Corporation  
612 So. Flower St., Los Angeles 17, Calif.  
Please send me my free copy of Dicalite Technical Bulletin E-41

Name \_\_\_\_\_ Title or Position \_\_\_\_\_  
Company \_\_\_\_\_  
Address \_\_\_\_\_  
City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_

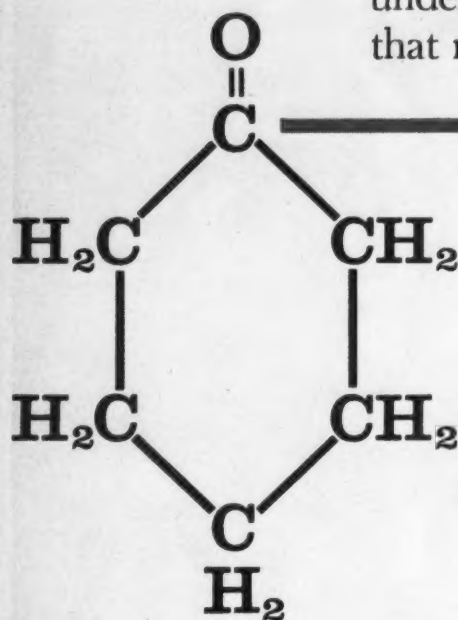


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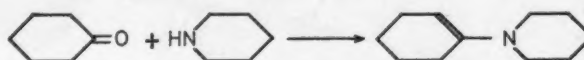


# Du Pont "Hytrol" O Cyclohexanone

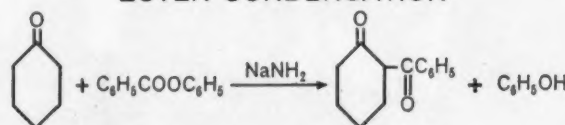
undergoes many interesting reactions  
that may suggest new applications for you



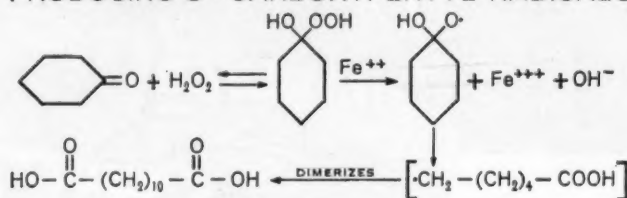
## AMINATION



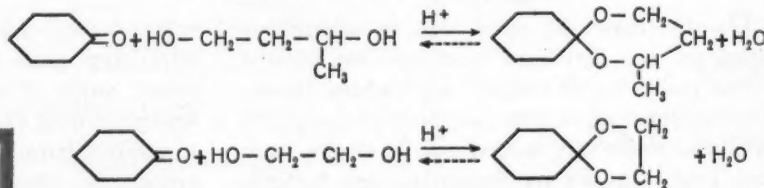
## ESTER CONDENSATION



## PRODUCING 5-CARBOXPENTYL RADICALS



## REACTION WITH GLYCOLS



## SPECIFICATIONS

Ketone Content	99.30% min.
Water	0.10% max.
Specific Gravity 25°/25°C.	0.9440-0.9460
Boiling Range at 760 mm.	
(ASTM D 1078-49T)	
1st Drop	153.5°C. min.
Dry Point	160.8°C. max.
Refractive Index, n <sub>D</sub> <sup>25°C.</sup>	1.4460-1.4500
Color, APHA	40 max.
Acid as Formic Acid	0.02% max.
Esters as Cyclohexyl Formate	0.70% max.
(All Percentages on Weight Basis)	

Du Pont "Hytrol" O cyclohexanone, a reactive cyclic ketone, is a most convenient starting chemical for new intermediates or a useful reactant to modify existing products. Because "Hytrol" O is tautomeric it opens the way to a host of interesting derivatives. It's a powerful, medium-boiling solvent for rubbers, fats and oils... can be used in the manufacture of resins, printing inks and adhesives.

**SEND FOR MORE INFORMATION TODAY.**  
Just write address below on your company letterhead for a product sheet on this unusual chemical—its physical and chemical properties—its uses and possible applications.



BETTER THINGS FOR BETTER LIVING  
... THROUGH CHEMISTRY

E. I. DU PONT DE NEMOURS & CO. (INC.), POLYCHEMICALS DEPARTMENT, N-2526, WILMINGTON 98, DELAWARE

Check 2763 opposite last page

## CHEMICAL MATERIALS

From preceding page

Formulations were developed by investigating solvents or solvent combinations which would produce an emulsion paint retaining all the desirable water-thinned characteristics, including clean-up in water, and at the same time give a composition which would show excellent adhesion to chalky and dirty surfaces. Tests resulted in a formulation based on a previously proven formula plus toluene at about a 10% level (see formula, page 69).

**Results:** In exposure tests made on unsealed cement-asbestos shingles painted with a "synthetic chalk", this formulation exhibited excellent adhesion. Chalk coat, spread at rate of 400 sq ft/gal, consisted of a 62% aqueous dispersion of titanium dioxide. On this surface, representative of a repaint surface exhibiting a very bad level of chalking, toluene-containing formulation showed no loss of adhesion after a seven month exposure test.

At this level of aromatic solvent, polyvinyl acetate emulsion paint retains characteristics of equipment clean-up in water in addition to inherent advantages of water-thinned coatings.

(CL-202 polyvinyl acetate copolymer emulsion is a product of Celanese Corporation of America, 180 Madison Ave., New York 16, N.Y.)

Check 2764 opposite last page.

## Sintering widens scope of tungsten carbide applications

**Uses:** Powders can be used for hard surfacing, abrasives, plastic dies, and other applications where a hard, wear-resistant material is required.

**Features:** Mikrocarbide powders have a cobalt binder for extra toughness and wear resistance. Sintered form widens application possibilities.

**Description:** Powders are composed primarily of sintered tungsten carbide with small amounts of titanium and tantalum carbides. Hardness of individual particles averages

# Dibutyl Sebacate

Outstandingly  
Efficient

## Plasticizer

odorless • tasteless • colorless

for use with

Vinyls  
Cellulosics  
Synthetic  
Rubbers  
Polymers

to prepare

Films and Sheet  
Extruded Products  
Solutions  
Plastisols and  
Organosols  
Molded Products

### Outstanding Performance Rating

- Excellent low temperature properties
- F.D.A. accepted
- Excellent ease of incorporation
- Very good heat blocking resistance
- Very good lubricity
- Low rate of extraction



Ask for information  
about other  
Plasticizers  
available for  
specific applications.

**The C.P. Hall Co.**  
CHEMICAL MANUFACTURERS

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MEMPHIS • LOS ANGELES

Check 2765 opposite last page

## CHEMICAL MATERIALS

91.5 Rockwell "A". Powders are available in bulk, in any mesh size from 3 to 325. They can be obtained with copper, nickel, or special alloy coatings for applications requiring better wettability, stronger bonding, or other properties.

(Mikrocarbide powders are a product of Shwayder Chemical Metallurgy Corp., 684 E. Woodbridge, Detroit 26, Mich.)

Check 2766 opposite last page.

### Alkyl silane fluid thermally stable

**Uses:** For hydraulic fluid in systems subjected to temperature and environment extremes. Shows promise as base oil in high-temperature turbine lubricants.

**Features:** Material is thermally stable in closed systems of  $-25^{\circ}\text{F}$  to  $550^{\circ}\text{F}$  for long periods, and up to  $700^{\circ}\text{F}$  for short periods.

**Description:** Product is synthetic fluid—diphenyldidodecylsilane, an alkyl silane—and is available in limited quantities.

(Dow Corning QF-6-7009 is a product of Dow Corning Corporation, Midland, Mich.)

Check 2767 opposite last page.

### New synthetic rubber has resistance to cracking

**Uses:** Developed as a rubber extender, synthetic material is destined for tires and other rubber products.

**Features:** Improves crack resistance of products in which it is used.

**Description:** Using butadiene as base material, synthetic rubber is prepared with lithium metal derivatives employed as catalyst. Rubber produced is substantially different from Ziegler-type catalysts.

(Diene synthetic rubber is manufactured by The Firestone Tire & Rubber Co., 1200 Firestone Pkwy., Akron 17, Ohio.)

Check 2768 opposite last page.

## selective reducing agents, polymerization catalysts, anti-oxidants, stabilizing agents— THE AMINE- BORANES

Dimethylamine-Borane,  $(\text{CH}_3)_2\text{NH}:\text{BH}_3$ ; Trimethylamine-Borane,  $(\text{CH}_3)_3\text{N}:\text{BH}_3$ ; and Pyridine-Borane,  $\text{C}_5\text{H}_5\text{N}:\text{BH}_3$ , are useful for reduction of aldehydes and ketones, for stabilization against color formation, for preparation of Diborane, as polymerization catalysts, and as petroleum additives.

Perhaps other Amine-Boranes would interest you. We can prepare these from secondary and tertiary amines—many primary Amine-Boranes lose hydrogen at room temperature to form amino-boranes. Let us know which complexes you think might be of use to you. For further information on the Amine-Boranes, write for Technical Bulletin C-200.

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Check 2769 opposite last page



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types. Each type is extremely versatile—readily adaptable to the special requirements of the product in which it is to be used.

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\*Odrene is the registered trade-mark for Sindar's series of fragrant additives.

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Check 2770 opposite last page

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Check 2771 opposite last page

## CHEMICAL MATERIALS

### Surface-active agent improves cleaning action on metals

**Uses:** Improves cleaning action and imparts inhibitive protection to all metal surfaces.

**Features:** Product shortens etching and cleaning time by reducing surface tension, allowing for faster and more even chemical action.

**Description:** Surface-active agent is stable over entire pH range in both muriatic acid and caustic soda as well as other acids and/or alkalis. Tests indicate that one percent is sufficient for muriatic acid and caustic soda production operations.

(Miranol C2M CONC is a product of The Miranol Chemical Co., Inc., 277 Coit St., Irvington, N.Y.)

Check 2772 opposite last page.

### Ethylenediamine group offered to industry

Availability of an unusual group of ethylene-diamine derivatives for use in wide range of industry was announced recently. Compounds are water-white, amine-like in color, and reported to be of highest purity. They can be employed in research and development of such products as pharmaceuticals, corrosion inhibitors, catalysts for polymerization of polyurethanes, polyphenols, epoxies, and also in preparation of chelating agents, quaternaries, anion exchange resins, insecticides and many other special organic chemicals.

(Ethylenediamine derivatives available from The Ames Laboratories, Inc., 132 Water St., South Norwalk, Conn.)

Check 2773 opposite last page.

### Dry fluidized vinyls for resin coating

Give uniform thicknesses

**Uses:** Coating metals by fluidized finishing process.

**Features:** Dry fluidized vi-

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TRADEMARK AP & CO

Check 2774 opposite last page

CHEMICAL PROCESSING



## CHEMICAL MATERIALS

nyl powders give uniform cladding thickness of 10 to 50 mils in single dip, providing surface free of drips, sags or pock marks encountered when using conventional coating solutions.

**Description:** Powdered resins available in variety of colors. Surface preparation procedures for metals prior to cladding parallel those normally used for processes employing solutions. Primer available where premium adhesion is indicated.

(Corvel vinyl fusion bond finishes products of National Polymer Products, Inc., Reading, Pennsylvania.)

Check 2775 opposite last page.

### 'Low static' styrenes for injection molding resist dust particles

**Uses:** Injection molding of styrene products.

**Features:** Product has virtually no attraction for dust particles.

**Description:** Two general purpose "low static" formulations available are Lustrex Lo-Stat 22, a standard molding grade; Lustrex Lo-Stat 29, which has improved heat resistance. Molding and physical properties are comparable to those of conventional general purpose styrenes. Formulations available in crystal and special colors at prices one cent higher than their counterparts in standard styrenes for injection molding.

(Lustrex Lo-Stat 22 and 29 are available from Plastics Div., Monsanto Chemical Company, Springfield, Mass.)

Check 2776 opposite last page.

**Metallic chloride catalysts** — Effect of moisture content on efficiency of these agents in curing butyl rubber with dimethylol phenol resin is described in 12-page study. Included are tables and curves showing effect of cure temperature and moisture content on cure-activity, physical properties, compression set and heat resistance. Bul 100-4C — Thiokol Chemical Corporation, 780 N. Clinton Ave., Trenton 7, N.J.

Check 2777 opposite last page.

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Heard the news about *International* magnesium oxide? Highest purity ever achieved in carload quantities...purity you'd expect to find only in laboratory-controlled samples. And it's in the low price range!

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A test sample of low-iron, low-lime *International* MgO in any of its three forms — powdered, pelletized or granular — is yours for the request. Please do — today.

#### CHEMICAL SPECIFICATIONS

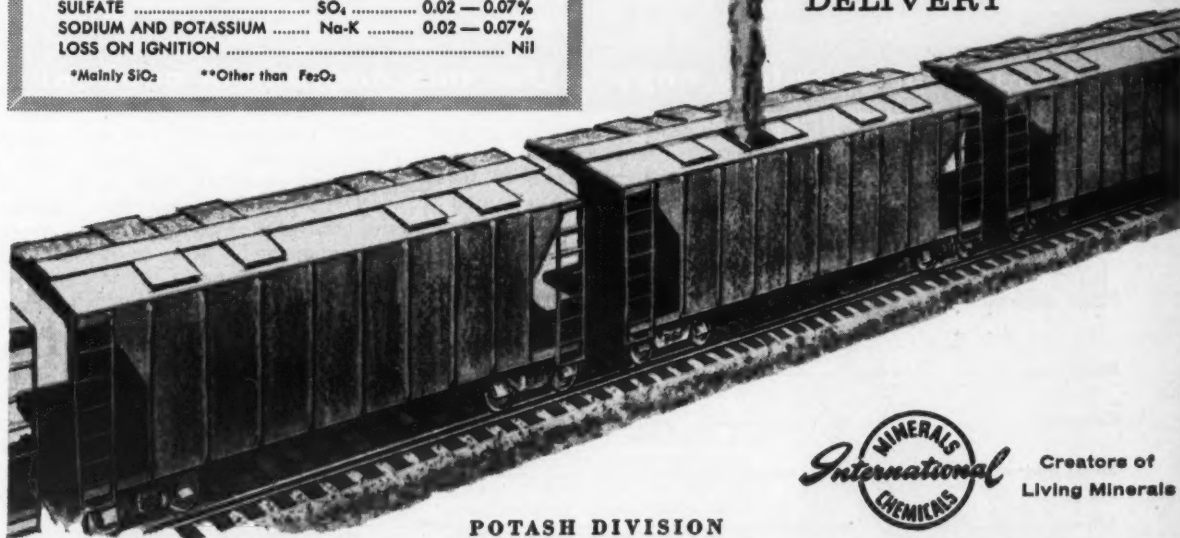
Chemical		Purity Range
MAGNESIUM OXIDE	MgO	99.40 — 99.70%
IRON	Fe <sub>2</sub> O <sub>3</sub>	0.03 — 0.06%
LIME	CaO	0.07 — 0.08%
ACID INSOL.*		0.02 — 0.10%
OXIDES**	R <sub>2</sub> O <sub>3</sub>	0.04 — 0.09%
BORON	B <sub>2</sub> O <sub>3</sub>	0.0025 — 0.015%
CHLORIDE	Cl	0.015 — 0.06%
SULFATE	SO <sub>4</sub>	0.02 — 0.07%
SODIUM AND POTASSIUM	Na-K	0.02 — 0.07%
LOSS ON IGNITION		Nil

\*Mainly SiO<sub>2</sub>

\*\*Other than Fe<sub>2</sub>O<sub>3</sub>

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Check 2778 opposite last page

PI-2-100

# TOWER PACKING

## All the facts about HARSHAW *tellerettes*

Contained in this comprehensive booklet discussing the application of Harshaw Tellerettes to tower packing.

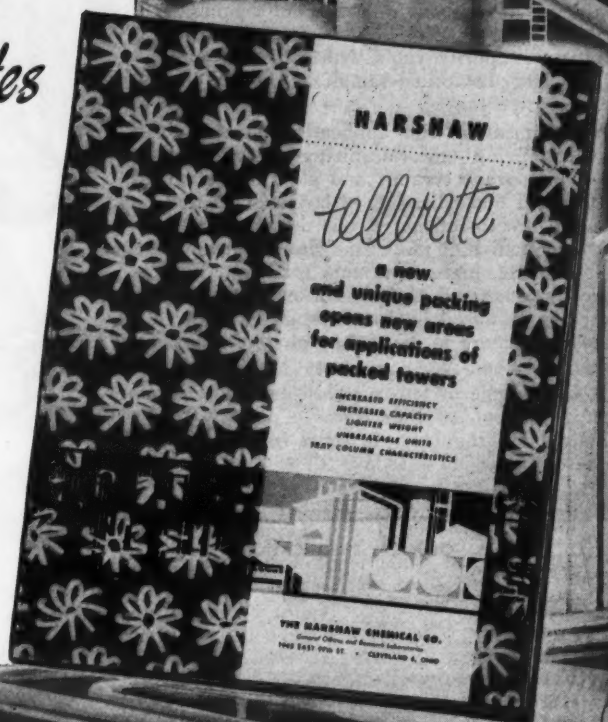
Subjects discussed at length (accompanied by pertinent charts)

1. The Tellerette Shape
2. Physical Characteristics
3. Lower Capital Investment and Operating Cost
4. Low Weight
5. Reduced Tower Height
6. Increased Tower Capacity
7. Support Plates
8. Corrosion Resistance
9. No Clogging

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Check 2779 opposite last page

## CHEMICAL MATERIALS

### Use of water as thinner makes this adhesive non-flammable

Uses: Laminating Formica or similar materials to wood and other surfaces.

Features: Latex-base adhesive permits water to be used as a thinner in place of flammable solvents. Costs are lower.

Description: Contact adhesive can be applied by brush, roller or spray. It has good heat resistance and long shelf life. Brushes and trowels used for application can be washed with water although adhesive, once dry, is resistant to water and solvents.

(Javatex latex-base contact adhesive is a product of Java Latex & Chemical Corp., 1713 W. Farms Rd., New York, New York.)

Check 2780 opposite last page.

### Develop casting spray to cut surface tension

Uses: Anti-foam agent to reduce surface tension in liquid epoxy casting systems.

Features: Material allows air bubbles to break easily, eliminates surface bubbles and pinholes in cured castings.

Description: Packaged in aerosol spray can, agent is sprayed in fine mist above resin surface and allowed to settle gently. Product most effective after liquid compound has been introduced into mold, but can be used before pouring.

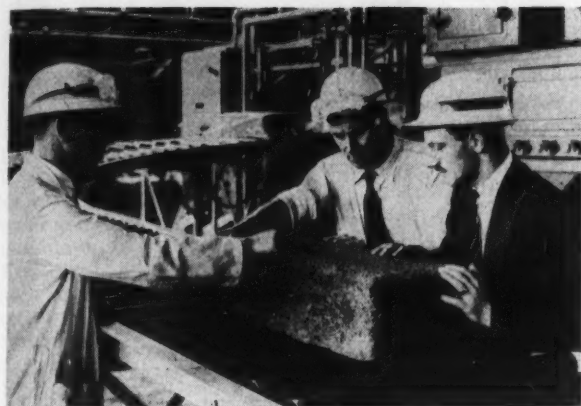
(Hysol M-453 Anti-Foam Spray is manufactured by Houghton Laboratories, Inc., Houghton Ave., Olean, N.Y.)

Check 2781 opposite last page.

**Samarium metal** — Relatively low boiling point and high neutron cross section distinguish this material from most rare earth metals. Reactor programs said to be taking long look at substance because of latter property. Cat Sheet 211 — Research Chemicals, Inc., PO Box 431, 170 W. Providencia St., Burbank, Calif.

Check 2782 opposite last page.

## CHEMICAL PROCESSING



Roller conveying after film wrapping

## FIRST Synthetic Rubber Plant in ENGLAND Built in Record Time

GR-S unit, which recently went on stream, uses salt water for cooling, highly efficient recovery methods, and other design features that saved construction costs and aid in economical operation

GORDON WEYERMULLER, Petrochemical Editor  
with D. A. BENNETT, General Manager  
The International Synthetic Rubber Co., Ltd.  
Fawley, England

ENGLAND's first synthetic rubber plant, which went on stream July 15, 1958, had one of the shortest engineering and construction periods for any chemical plant of comparable size ever built in England. To plan, engineer, procure, and erect plant took just 19 months. A number of design features are utilized that cut construction costs and facilitate smooth operation. Plant developed very few bugs in the startup.

Capacity of plant is 50,000 long tons of GR-S synthetic rubber per year. Located near Fawley, England, the plant is owned by The International Synthetic Rubber Co., Ltd. This is a new company the principal shareholders of which are Dunlop Rubber Co., Ltd., The Goodyear Tyre & Rubber Co. (Great Britain) Ltd., The Firestone Tyre & Rubber Co., and Michelin Tyre Co., Ltd.

Up to now all synthetic rubber used in England has been imported. It is estimated that England will save large sums on import duties, transporta-

tion, and manufacturing costs. An added advantage will be reliability of supply.

### Features of Plant

Plant is located adjacent to a large refinery of Esso Petroleum Co., Ltd., which furnishes butadiene for process. In addition to being close to raw material supplies, plant is near Southampton Water, making the future installation of dock facilities feasible, if warranted.

Location in this area also gives plant an available supply of seawater with a maximum temperature of 66°F for cooling. Steel pipe through which seawater enters plant and storage tank for it are both concrete lined. Carbon steel pipe is used for above-ground seawater distribution system. A considerable saving in investment and operating costs was made by using seawater for subcooling in recovery area for both butadiene and styrene.

Vent gases from condenser pass through a refrigeration

unit. Vent gases from this refrigeration unit go through a kerosene scrubber to remove last traces of butadiene from non-condensable gases. Hence, butadiene is returned to process that would otherwise be lost. More than 95% of unreacted butadiene and styrene is recovered.

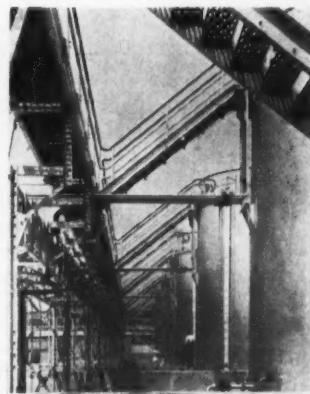
Use of carbon steel reactors provides a saving in capital costs over the glass-lined reactors thought to be necessary in synthetic rubber plants built in the past. Stainless steel is used for a portion of equipment not because of corrosion but because rubber does not adhere to it as readily as it does to carbon steel. This decreases cleaning time.

Since a suitable gas supply was not available and use of oil was undesirable from a contamination standpoint, steam-heated dryers are used.

One reason for the speedy construction time for plant was the good delivery setup for the equipment. Although the great majority of the equipment was made in England, some items were ob-

tained in other countries. Six large glass-lined latex surge tanks, each of which holds 10,400 Imperial gal, were purchased from Glascote in the United States. Neither England nor Germany had facilities to fire vessels of this large size.

Bale dusters and film wrappers also came from the United States. Light-gage styrene stripping columns



Section of styrene stripping tank farm and pipe track



were fabricated in Italy. Some equipment was obtained from West Germany.

One interesting aspect of instrumentation is that a centralized control panel is not used, individual panels for various processing units or areas having been found preferable for this plant. Butadiene, styrene, and other materials are metered continuously into reactors. Cascade controls are used to regulate reactor temperature.

Purity of butadiene as received in plant is 98% and styrene is 99%. Plant is designed for 60% conversion of monomer to rubber. Types of synthetic rubber being produced include regular and oil-extended GR-S rubbers of the staining and non-staining types.

#### Description of Process

Butadiene from Esso and recycled butadiene from copolymer recovery system are blended together, and this blend is used as the feed material to reactor system.

A portion of recycled butadiene is returned to Esso for purification. Before butadiene is used for polymerization, the inhibitor is removed by means of a caustic wash in the mixer unit. Purified butadiene is separated from caustic wash by decantation, after which it is cooled and collected in butadiene surge tanks. These tanks serve as feed tanks to reactor system. Oxidant is added to the butadiene stream prior to that stream entering charging header.

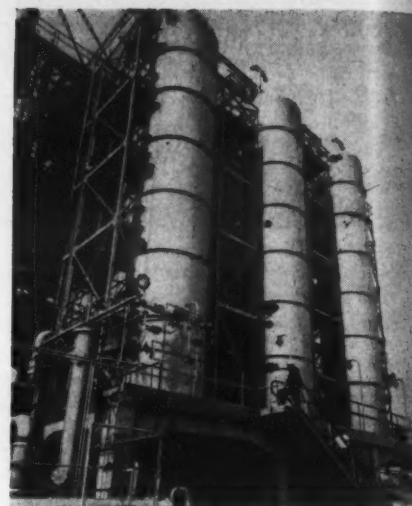
Styrene, along with recycle styrene from the copolymer recovery system, is transferred to the styrene surge tanks, which serve as feed tanks for the polymerization system. Modifier is added to the styrene stream prior to that stream entering the charge header. Third stream entering the charge header is soap solution containing a sequestering agent, a dispersing agent, an electrolyte, and treated water, plus liquid and solid soaps, potassium or sodium hydroxide for pH adjustment, sodium nitrite, and

treated and decanted water.

Mixture of soap solution and monomer in the charge header flows through coolers into reactor train. At entrance of reactor train, activator solution is added. Reactors are maintained at a temperature of 42°F. Reactors are connected in series and the flow through them is continuous.

Mixture leaving the reactor train is contacted with shortstop solution to stop reaction at approximately 60% conversion. It then flows through a reducing station where the pressure is dropped from 50 to 40 psig, and, in continuous flow, through the latex surge tanks in which the latex is heated to 120°F with direct sparge steam.

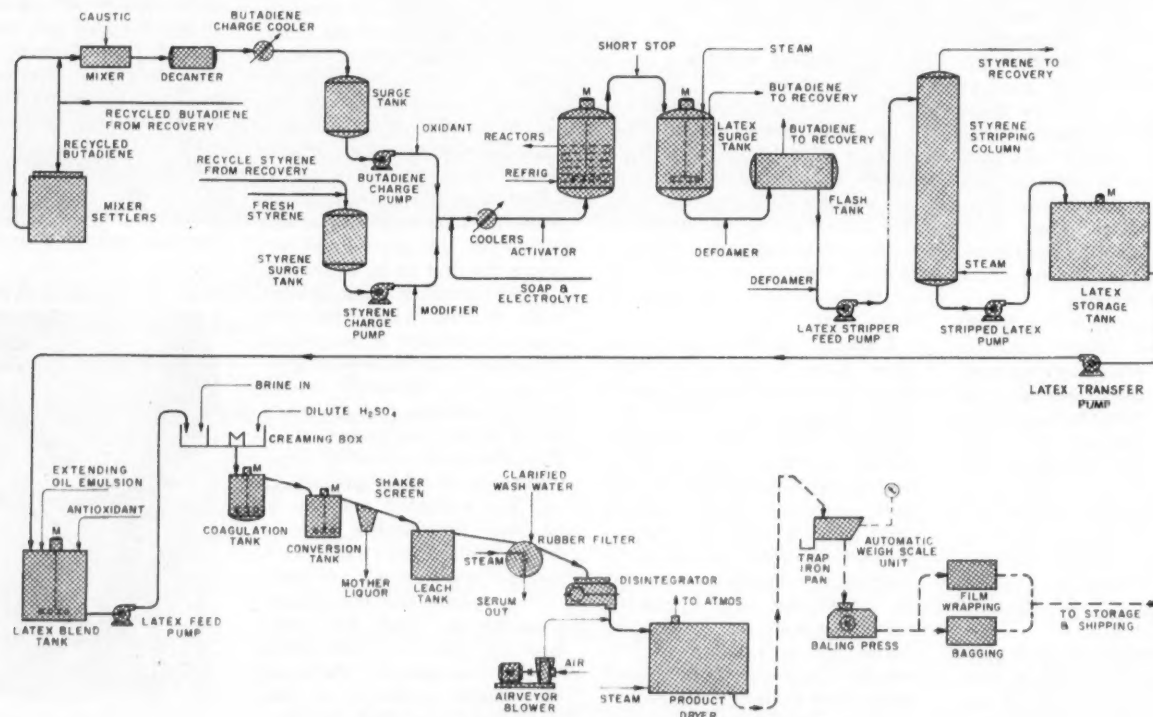
Butadiene evolved during this depressurizing and heating step flows to butadiene recovery system. Partially stripped latex flows from the surge tanks through the latex pressure flash tanks where the pressure is reduced to 3 psig, and through the latex vacuum flash tanks where the pressure is 33 mm Hg.



Styrene stripping columns

Butadiene evolved from the flash tanks flows to the butadiene recovery system where it is compressed, condensed, and recycled back to the feed system. Part is returned to the butadiene plant for re-purification and the remainder is blended with fresh butadiene and fed into reaction system.

Butadiene-stripped latex flows from the flash tanks in



FLOW CHART FOR SYNTHETIC RUBBER PROCESS

to the styrene stripping columns which operate at a top tower pressure of 100 mm. Stripped latex flows from the stripper column to the latex storage tanks. Styrene and water vapor leaving the stripping column are condensed and separated by decanting. Styrene is then recycled back to the feed system.

Latex blend tanks are provided so that control of uniformity of latex feed to coagulation system can be maintained. Antioxidant is added to blend tanks. This may be either the non-staining liquid type or staining solid type, which is dispersed in water.

The latex is coagulated and the slurry of coagulated material overflows to a shaker screen from which mother liquor is drawn off to storage tanks for subsequent use. Wet crumb is discharged into leach tanks. Crumb is washed with weak serum and passed to rubber filter. Filter cake is discharged continuously to a disintegrator, from which it is blown through a pneumatic airveyor to top apron of dryer. Weak serum is collected and reused in the coagulation operation.

Moisture content of the polymer is reduced from 33% to 0.5% in the dryers. Dried polymer is transferred by means of conveyors and bucket elevators to surge hoppers, from which it is fed intermittently to the automatic weigh scale. From this scale, 80-lb charges of dry crumb are charged into the hydraulic baling press. Bales are then moved by means of a series of conveyors into either the film wrapping or the bagging systems. Both the bag and film wrapped bales are then palletized and shipped or stored.

(Plant was designed and constructed by Chemical Plants Div., Blaw-Knox Co., 300 Sixth Ave., Pittsburgh 22, Pa. Company is presently building a similar synthetic rubber plant in the United States and also one in Japan.)

Check 2783 opposite last page.

(Matthew Hall, Ltd. performed detailed engineering on plant and was prime contractor for installation of mechanical equipment. John Lang, Ltd. was prime civil contractor.)



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The superiority of Helicoid Gages is most evident in severe service—wherever a gage is subjected to violent pressure pulsations or severe mechanical vibrations.

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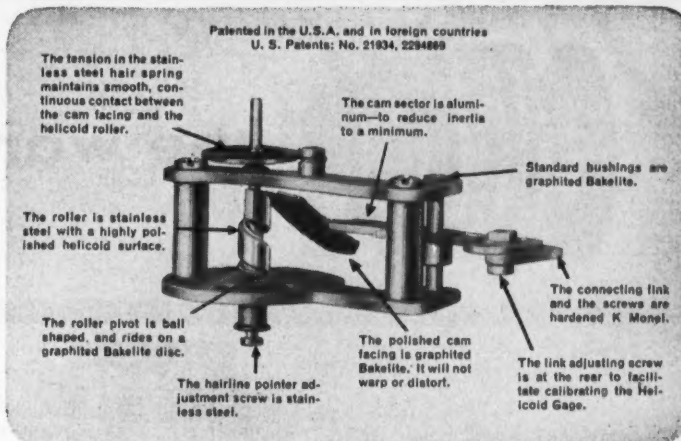
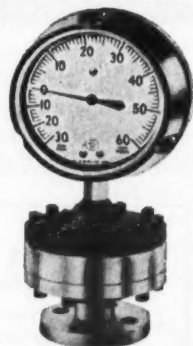
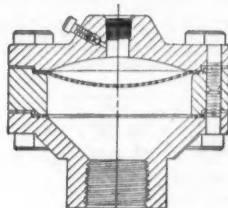
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Only Helicoid Gages have the external pointer adjustment pictured here. The Helicoid type adjustment cannot be jarred out of position.

Calibration of Helicoid Gages is accomplished easily, without removing dial or pointer, because the link adjusting screw is at the rear of the system.

### THE CHEMICAL GAGE

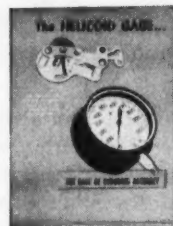
The Helicoid Chemical Gage has a guaranteed accuracy of plus or minus 1%. It is applicable for working pressures from 30" vacuum to 5000 p.s.i. and temperatures to 400° F. It is particularly suitable for chemicals and other viscous fluids which might clog or corrode a Bourdon tube. Pressure and/or vacuum is transmitted directly to the indicating gage element through deflection of a Teflon or Kel F sealing diaphragm. The indicating system above the diaphragm is filled completely with specific inert liquids.



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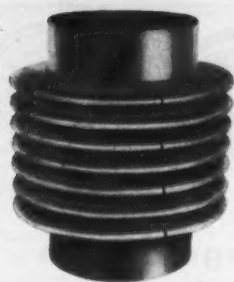
929-P Connecticut Avenue • Bridgeport 2, Connecticut



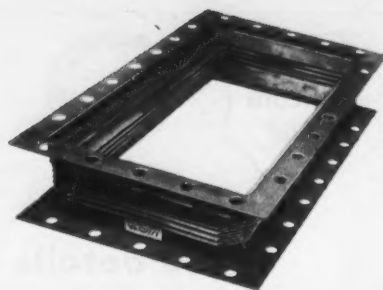
Helicoid gives you all these features at prices that are competitive in the quality gage field

Check 2784 opposite last page

**Solar**

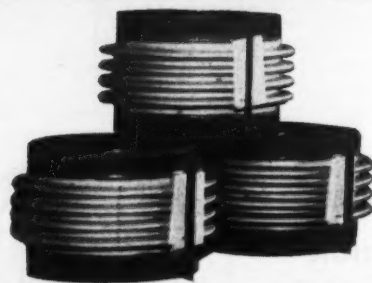


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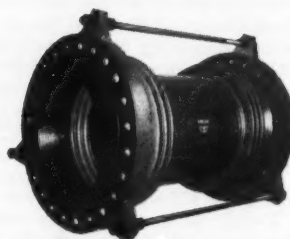
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SAN DIEGO  
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Check 2785 opposite last page

## PETROCHEMICALS

**Flat finned-tube heater advantageous for low tanks**

Can also be used for floating-roof tanks

In a refinery in Oklahoma a heater constructed of horizontal finned coils is being installed in a tank whose height is only 10'. This type of heater has been found to be of



Heater does not foul easily

particular advantage for low tanks like this one.

This heater requires a clearance of only 15". For this reason it has also been found useful for floating roof tanks. Minimum clearance of tank bottom is 2". Heater is mounted on legs. Clearance, plus convection effects, keep heater free from fouling by sediment. Pitch of mounting assures runoff of condensate.

Use of fins gives heater tubes about six times the heat transfer surface of an equal length of plain tube. Heater can be easily installed through a 20" manhole. It can be furnished in mild steel, chrome alloy, or nickel.

(FR-11 low tank heater is product of Brown Fintube Co., Elyria, Ohio.)

Check 2786 opposite last page.

(Tank heater is being furnished to the Oklahoma refinery by Western Supply Co., PO Box 1888, Tulsa, Okla.)

Check 2787 opposite last page.

**Level controller** consisting of a capacitance-sensitive probe and a pneumatic controller is described and illustrated in four-page bulletin. Device is said to be particularly valuable for application in vessels and small tanks which will not permit installation of systems requiring large detection devices within the tank. Bul RF-587 — Aeronautical & Instrument Div., Robertshaw-Fulton Controls Co., Anaheim, Calif.

Check 2788 opposite last page.

CHEMICAL PROCESSING



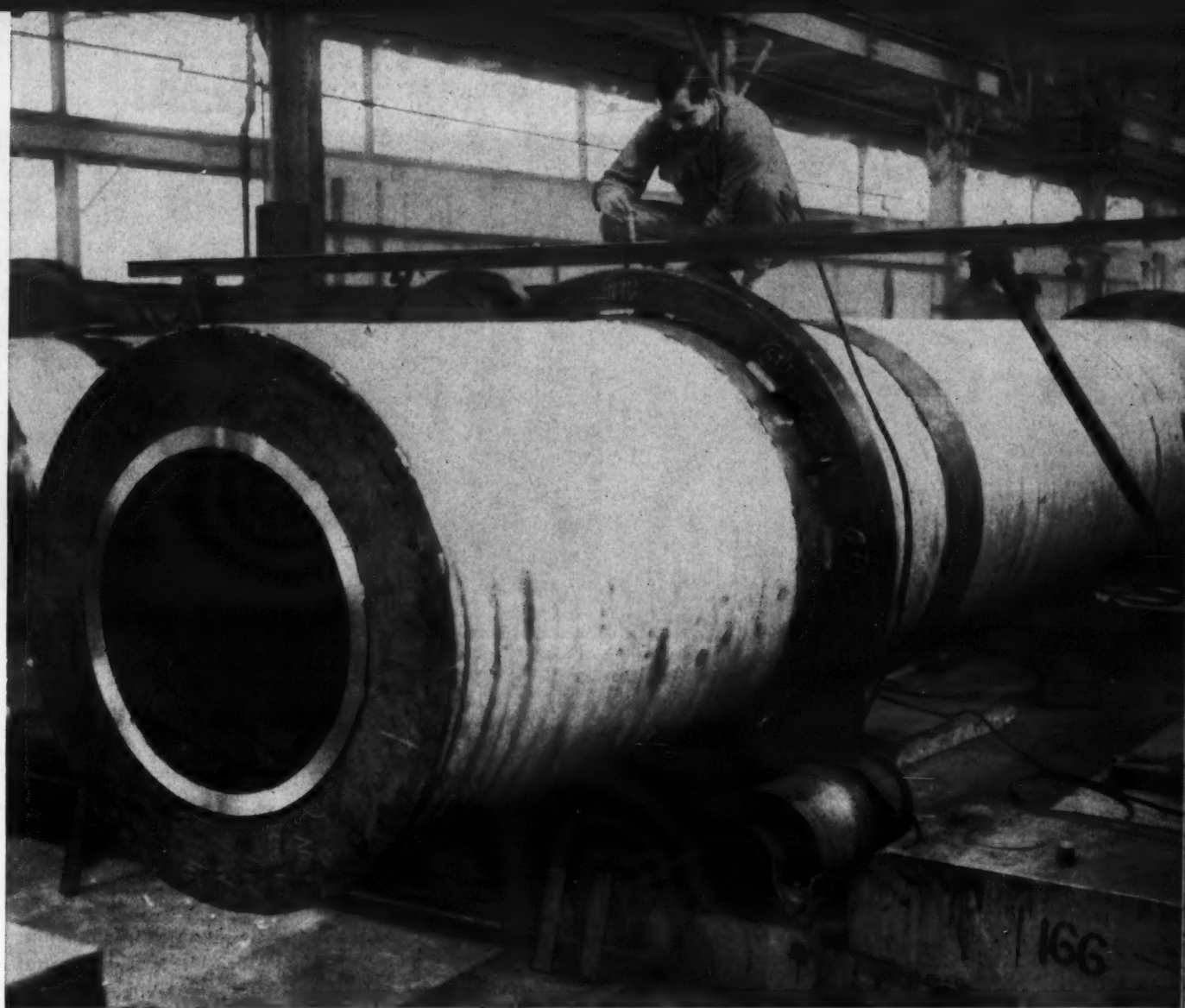
## THAT'S INTERESTING

### **Inert gas welding way**

Field application of inert gas welding methods is now possible through use of circular piece of kraft paper, according to Stone & Webster Engineering Corp. Paper is attached with masking tape as a baffle six inches from ends of pipe to be joined. Paper is able to withstand pressure of 3 or 4 ounces an inch exerted by inert gas, and welding heat of up to 600°F. But at end of process, during annealing or stress-relieving phase, both paper and masking tape disintegrate, leaving pipe clean.

### **Inhibiting corrosion**

In a study on inhibiting corrosion of aluminum, conducted in France, detergent alkalies were used. Two grams of silicate were found to be effective against the attack of 20 grams of soda ash per liter; 4 grams protect against the same concentration of sodium of phosphate. (Silicate P's & Q's, Philadelphia Quartz Company)



## 1600° temperature dries salt in Stainless Steel

You're looking at a Stainless Steel rotary salt drier. It's used to de-moisturize salt, one step in making high octane gas.

C. O. Barlett & Snow Co., Cleveland, Ohio, built the drier with Stainless Steel because of all the materials tested, Stainless Steel stands up better under the tremendous heat—1600°F.—of the combustion gases used to dry the salt. And because Stainless is corrosion resistant, it can handle the salt, which has a moisture content as high as .5% when it's fed into the drier.

The salt comes out of the drier in a dry and free-flowing state. It's placed in electrolytic cells where it's reduced to chlorine, a by-product, and molten sodium, the ingredient for high octane gas.

Equipment designed for high heat and corrosion resistance wears better and lasts years longer when it's built with Stainless Steel. Specify Stainless Steel for your plant equipment. And if you want service-tested quality, specify USS Stainless Steel.

*USS is a registered trademark*

United States Steel Corporation—Pittsburgh  
American Steel & Wire—Cleveland  
National Tube—Pittsburgh  
Columbia-Geneva Steel—San Francisco  
Tennessee Coal & Iron—Fairfield, Alabama  
United States Steel Supply—Steel Service Centers  
United States Steel Export Company



## United States Steel

So SIMPLE that  
"Specials" are  
Likely to be  
Standard!



A sleeve, raised and lowered within a non-magnetic tube, attracts or releases an Alnico magnet attached to a mercury switch. Basically, this is Magnetrol

**MAGNETROL**

The World's Most Dependable  
**LIQUID LEVEL CONTROL**

Because of the utter simplicity of Magnetrol's magnetic operating principle, standard models can be easily adapted to meet any special requirements for pressure, temperature or corrosive liquids . . . and usually at little extra cost. This Magnetrol versatility has solved all kinds of tough level control problems . . . and given our engineers wide application experience that can be invaluable to you.

Magnetrol is so simple that failure is all but impossible! Using only permanent, unfailing magnetic force for its operation, there's nothing to wear out . . . no diaphragms or bellows to stiffen and rupture . . . no electrodes to short or corrode . . . no packing to bind or leak. Magnetrol is practically maintenance-free! Magnetrol units are available for controlling level changes from .0025-in. to 150-ft. . . with multi-stage switching when desired. Send coupon for full details.

**MAGNETROL, Inc.**

Send Coupon  
For Full Details

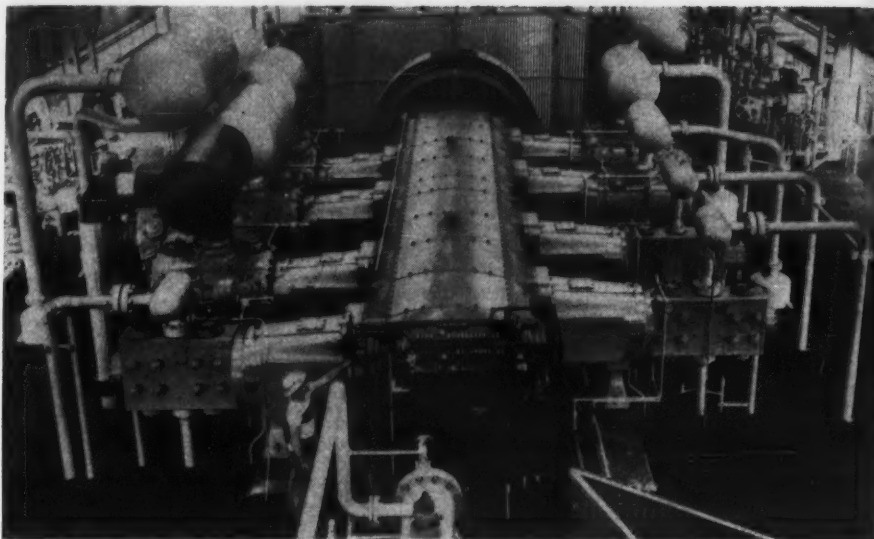
MAGNETROL, Inc., 2129 S. Marshall Blvd., Chicago 23, Illinois

Please send me catalog data and full information on Magnetrol Liquid Level Controls.

Name \_\_\_\_\_  
Company \_\_\_\_\_  
Address \_\_\_\_\_  
City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_

Check 2789 opposite last page

**PETROCHEMICALS**



One of eight-cylinder compressors in service at Southern Nitrogen. Four cylinders on right compress synthesis gas in four stages. Third cylinder from front on left is the tandem cylinder

## One compressor does work of eight

Flexible unit is first of its type in the  
country to handle all gases in ammonia  
synthesis plant — results in lower capital  
expenditure for compression needs

Unusual design of 10,000-hp compressor (with four cylinders on each side — see photo) allows two units of this type to meet all compression needs for the 250 ton/day ammonia plant of Southern Nitrogen Co., Inc., at Savannah, Ga. Each compressor can handle all process gases, each taking care of 50% of the plant capacity.

With its eight cylinders, one compressor can do the work of eight. In addition to furnishing flexibility, use of this type of compressor has meant a savings in initial capital investment for both equipment and installation. Compressors have given good service since plant went on stream in November 1957.

One side of each compressor handles the synthesis gas — which consists of about 25% nitrogen (Mol%) and 75% hydrogen. This synthesis gas is com-

pressed in four stages with the four compressor cylinders to 5125 psi.

### Ammonia and Air

First cylinder on the other side handles the compression of ammonia for refrigeration during the summer months. Second cylinder, which is a tandem unit, and the third cylinder compress air in three stages to 150 psi for reforming furnace. Fourth cylinder recycles mixture of synthesis gas and air.

Each compressor is automatically controlled. Powered by electric motors, each unit runs at 257 rpm.

(Eight-cylinder compressor is product of Cooper-Bessemer Corporation, Mt. Vernon, Ohio.)

Check 2790 opposite last page.

**Transfer of products  
to tankers speeded  
with loading arms**

**Uses:** For transfer of petrochemicals and petroleum products to lake tankers and barges.

**Features:** Device cuts barge loading time and eliminates hose bursts. It prevents most line handling injuries and minimizes dock clutter. Unit handles temperatures from



Mechanically operated barge and tanker loading arm at a midwestern refinery

—60 to 225°F at pressures to 300 psi.

**Description:** Gear reduction on loading arms enables one man to lower swivel-jointed 6 or 8" pipe to horizontal position to facilitate hookup. Use of counterweights makes movement of unit easy. Free wheeling facilitates transfer.

(Barge loading arms are product of Chiksan Company, subs. Food Machinery & Chemical Corp., Brea, Calif.)

Check 2791 opposite last page.

**Forged steel unions and fittings** are described in detail in sixteen-page folder. Fittings range from 2000 through 6000 lb CWP. Cat on forged steel unions — Clayton Mark & Company, 1900 Dempster Street, Evanston, Illinois.

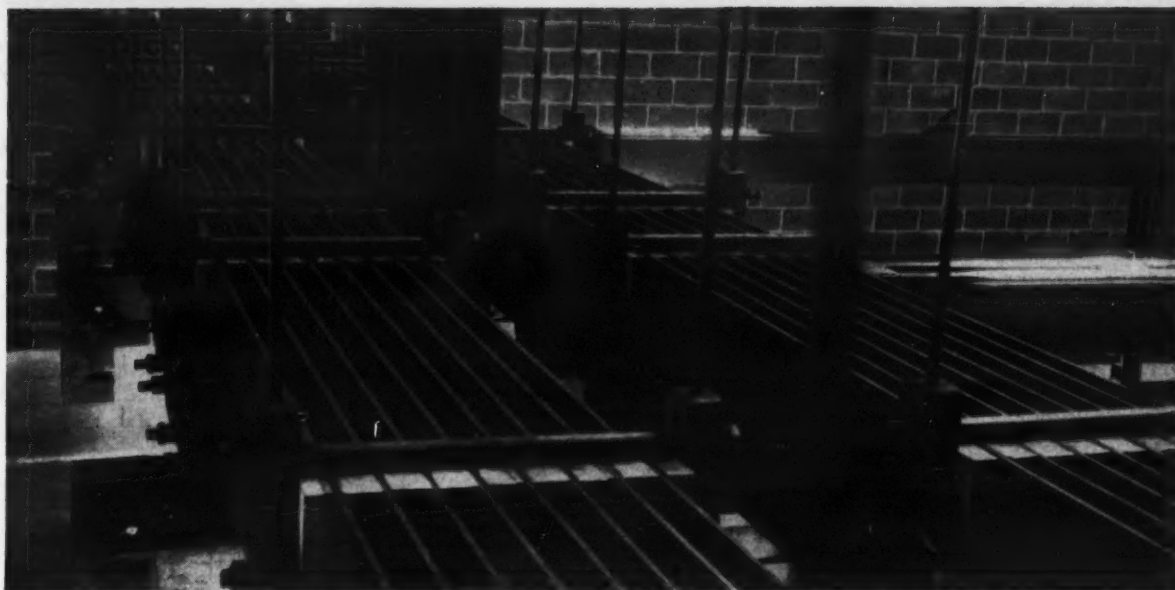
Check 2792 opposite last page.

**Acetylene processes**, developed originally by Societe de l'Azote (SBA) of Belgium to produce high-purity acetylene from natural gas or from naphtha and other liquid feedstocks, are described.

Including a general flow sheet, brochure contains supplementary information giving summary of direct operating costs for four cases with natural gas and naphtha as feeds, and economics of acetylene production for the same four cases. Acetylene Process Bul — The M. W. Kellogg Co., Subs. of Pullman Incorporated, 711 Third Ave., New York 17, N.Y.

Check 2793 opposite last page.

**R&IE LOW VOLTAGE BUS**



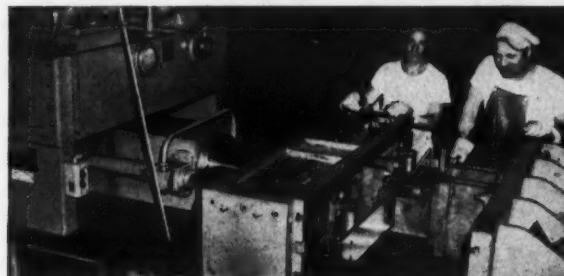
Overhead view of 45,000 amp a-c bus feeding bank of graphitizing furnaces at Stackpole Carbon Company. Bus is interleaved to reduce reactance drop. Insulation is Transite.

## FIRST-CLASS AVENUES FOR YOUR AMPERES

R&IE's broad experience in low voltage bus design and fabrication—for electrochemical and electrothermal processes—means high current distribution systems that are easier to install, longer lasting, and trouble-free. And, by supplying a fully detailed set of assembly and installation drawings with each system, R&IE assures simpler, lower-cost future expansion.



**Experienced R&IE bus design engineers** are available to join in your early planning. Their knowledge can help reduce costs . . . improve system performance. They will determine the most suitable materials, protective finishes, bus size and configuration. Later they will provide sound solutions to design problems such as bus support spacing for maximum short circuit protection, provision for structural misalignment, and proper application of disconnecting switches.



**Skilled workmen, using specialized machinery**, produce bus components accurately and efficiently, assuring low production costs and fast, trial-and-error-free installation. R&IE shop personnel are thoroughly familiar with the fabrication of aluminum and copper. And they have at their disposal a full range of specially adapted tools and machinery for highly accurate cutting, punching, forming, welding and assembling bus, disconnecting switches and flexible bus connectors.

For complete information about R&IE's low voltage bus design and fabrication service, write for Bulletin 1220C, or contact your nearby I-T-E sales office. In Canada: Eastern Power Devices Ltd., Port Credit, Ont.



**I-T-E CIRCUIT BREAKER COMPANY**  
R&IE EQUIPMENT DIVISION • GREENSBURG, PA.

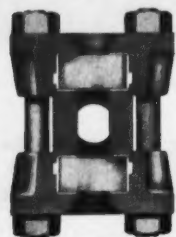
Check 2794 opposite last page



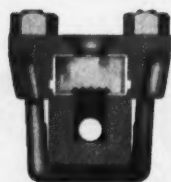
# Strahman

## HIGH PRESSURE GAUGES

USED IN  
REFINERIES  
AND  
CHEMICAL PLANTS  
THROUGHOUT  
THE WORLD



THRU VISION



REFLEX  
Single or Multiple  
Sections

TUBULAR

Gauge Cocks  
Large Chamber  
Reflex Gauges  
Heated or Cooled  
Gauges

SEND FOR  
COMPLETE  
CATALOGUE

STRAHMAN VALVES, Inc.  
16 Hudson St., New York 13, U.S.A.

Check 2795 opposite last page

## PETROCHEMICALS

Digital computer control and data logging are discussed in two-color, four-page bul. Detailed specs are listed for digital computer engineered for automatic on-line control of industrial processes. Ref Bul RW-300 — The Thompson-Ramo-Wooldridge Products Co., PO Box 45067, Airport Station, Los Angeles 45, Calif.

Check 2796 opposite last page.

### Stability of operations improved by scanner

Can check several hundred temperatures

Maintenance of process stability and close reproduction of operating conditions are advantages of scanning instrument currently being introduced in petrochemical plants. Scanner can check several hundred thermocouples in reactor shells or on other operating equipment.

This digital variable indicator and temperature monitoring system scans the large number of thermocouples at five per second and determines when any exceed preset common off-normal set point or a preset common alarm set point. If the first setting is exceeded, the time and identity of the off-normal point is recorded on an adding machine-type printer. If the 2nd (higher) setting is exceeded, the system shuts down the plant, insuring safety. System also has a digital display panel such that the thermocouple inputs can be programmed through an analog-digital system and be viewed at the panel. In this manner digital trends may be observed on any of these points.

Ability to centrally perform these functions is based on the utilization of electronic comparing and analog to digital conversion circuits coupled with high reliability relay matrices for input scanning.

Instrument incorporates remotely (field) located scanning relays which sequentially transmit the thermocouple signals through a common cable to the data system located in the control room. These signals are then fed through a specially designed chopper amplifier which, in

## BLINDS • SPACER RINGS • STRAINERS • FLANGES

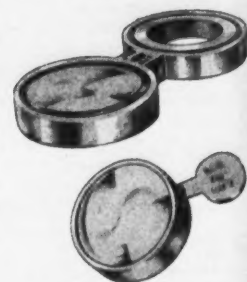


### WITH EQUAL STRESS ON QUALITY and SERVICE

Phone Sandusky MAIN 6-3712 FOR BOTH!

That's right! If an emergency or close schedule catches you—phone us. We either have the best of equipment you need in stock or the facilities and skill to make it up at once.

Specialists to the Petro-Chemical Engineering Field for many years MAC-IRON is a producer of temporary strainers, spectacle blinds, spade blinds, and allied equipment which incorporate construction principles, design features, and materials that set them apart as the finest obtainable.



You'll want a copy of MAC-IRON Catalog A-7 which presents a complete engineering picture—Descriptions—Specifications—Data. Your request will receive prompt attention. PHONE OR WIRE FOR IMMEDIATE PRODUCTION OR CONSULTATION SERVICE.

"IF YOU USE PUMPS  
You need MAC-IRON Strainers"

## THE MACK IRON WORKS COMPANY

122 WARREN STREET, SANDUSKY, OHIO

Check 2797 opposite last page

### DIRECT FROM MANUFACTURER To YOU!

### Tower Packings

A Raschig Ring  
B Single-Partition Ring  
C Cross-Partition Ring  
D Berl Saddles

- Non-porous
- High Chemical Purity
- Iron Free
- Uniform Quality
- Great Mechanical Strength
- Will not crumble

The carload orders and repeat business coming to us year after year proves that our customers are convinced that they are getting real Economy plus. Quality by using KNOX Raschig Rings.

You're being Quality-wise and Dollar-wise when you specify KNOX for initial installations or replacements.

To lower your present operating costs send for our price list and samples.

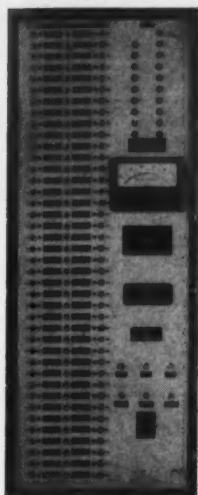
**IRON FREE**

Always Specify Tower Packings

**KNOX PORCELAIN CORPORATION**  
KNOXVILLE 1, TENNESSEE

Check 2798 opposite last page

CHEMICAL PROCESSING



Scanner panel

In addition to amplifying the millivolt signals, automatically rejects 60 cycle noise and isolates the input and output circuitry to eliminate any ground loop problems. These amplified values are then electronically compared to preset alarm limits and/or are fed through the analog to digital system to the display panel.

System employs the ramp or sweep voltage method of conversion whereby the amplified input voltages are compared to a generated voltage which rises linearly with time. The time consumed to rise from 0 to the unknown input voltage determines the number of counts that are transmitted to storage and, subsequently, displayed. One of the unique features of the instrument is the ability to characterize the sweep voltage so that it exactly matches the emf curve of the type of thermocouples being sampled.

(Scanning system is development of Kybernetes Div., Hagan Chemicals & Controls, Inc., PO Box 1346, Pittsburgh 30, Pennsylvania.)

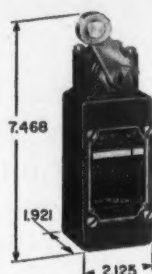
Check 2799 opposite last page.

Compressors for all types of heavy-duty industrial refrigeration service are illustrated and described in 18-page bulletin. Typical installations in petrochemical plants are shown. Bul 112-J — Frick Company, Waynesboro, Pa.

Check 2800 opposite last page.



# MICRO SWITCH Precision Switches



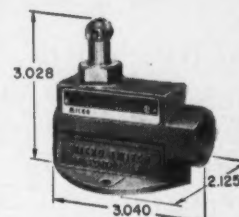
1 HEAVY DUTY LIMIT SWITCH



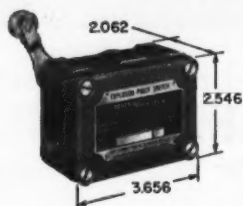
2 "PLUG-IN LIMIT" SWITCH



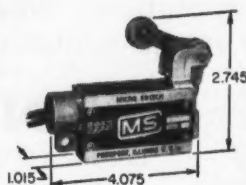
3 SMALL, 2-CIRCUIT LIMIT SWITCH



4 GENERAL PURPOSE LIMIT SWITCH



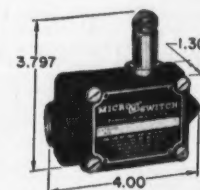
5 EXPLOSION-PROOF SWITCH



6 GENERAL PURPOSE LIMIT SWITCH



7 BASIC PIN-PLUNGER SWITCH



8 HIGH-CAPACITY LIMIT SWITCH

**A complete line of precision switches  
to make plant equipment safer,  
more automatic and more productive**

For years plant operating men have been putting new life into old machines—at low cost—by installing MICRO SWITCH Precision Switches used to make machines more automatic, safer and more productive.

1 Heavy duty limit switch with rugged sealed enclosure. Choice of actuator designs and circuit arrangement. (Catalog 84)

2 "Plug-in Limit" switch. Working parts plug into permanent base like a radio tube. Replace in seconds. (Catalog 84)

3 Small two-circuit limit switch. Enclosure completely sealed. Roller arm and head assembly fully adjustable. (Catalog 84)

4 General purpose limit switch. Available

side- or bottom-mounted with variety of actuator designs. (Catalog 83)

5 Smallest explosion-proof switch available. Underwriters' listed for hazardous atmospheres: Class I, Groups C and D, Class II, Groups E, F & G. (Catalog 83)

6 General purpose limit switch in zinc alloy housing. Sealed against dirt, dust and liquid splash. (Catalog 83)

7 Basic pin plunger switch. A small, complete and self-contained switching unit. Available with wide variety of actuators, contact arrangements and terminals. (Catalog 62)

8 High capacity switch will make and break steady state currents of 20 amperes, switch inrush currents to 75 amperes. (Catalog 83)

MICRO SWITCH... FREEPORT, ILL.

A division of Honeywell  
In Canada: Honeywell Controls, Ltd.  
Toronto 17, Ontario



**Honeywell**  
MICRO SWITCH PRECISION SWITCHES

Check 2801 opposite last page

# POTENTIAL

... here's *full* potential for oil refineries, chemical and heavy industrial plants, because ...

**FABRICATION** ... of all types of equipment (*Fractionating Columns, Gas Columns, Pressure Vessels, Plate and Heavy Steel Work, Special Machines, Autoclaves, Shells, Base Bridge Girders*) ... is performed to order ... to specification.

**MACHINING** ... fully equipped, flexible facilities for machining to close tolerances, regardless of product size or design.

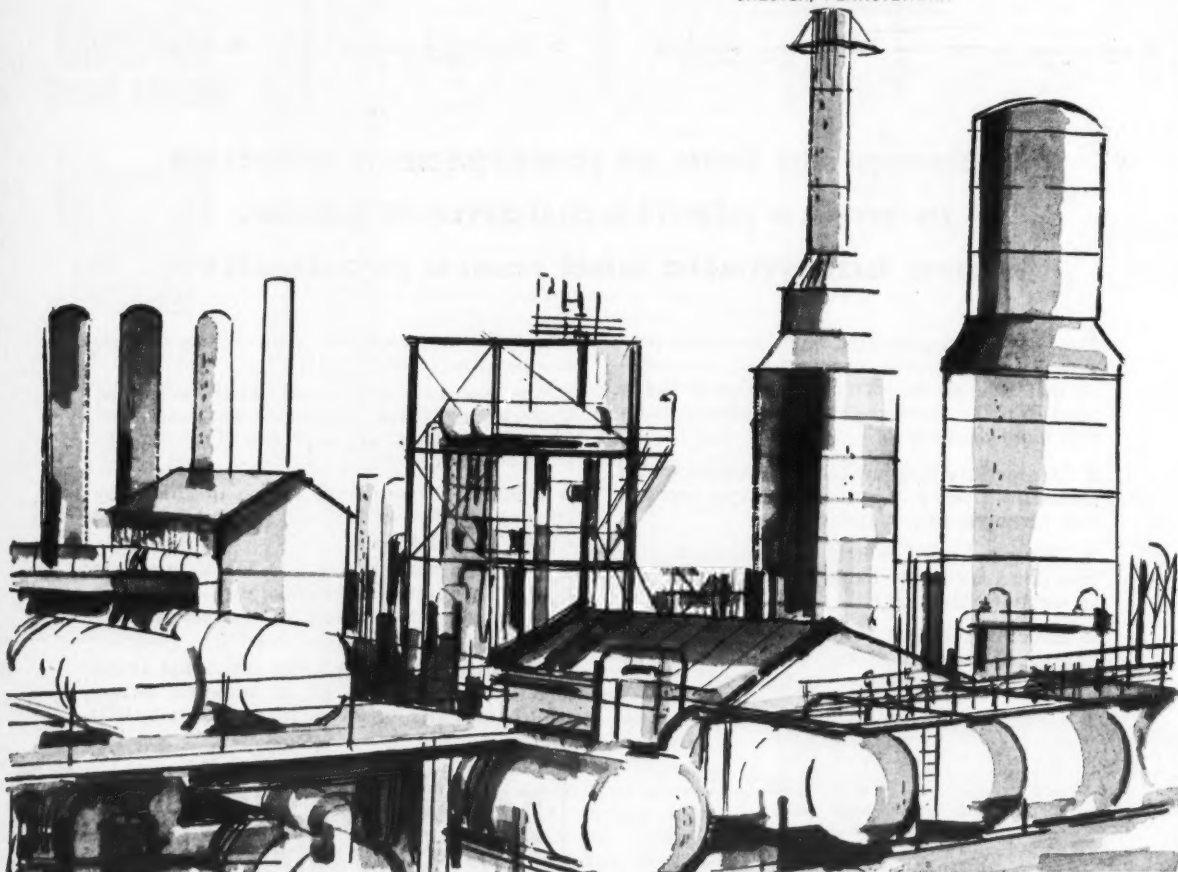
**STAINLESS** ... separate, integrated shop for stainless fabrication protects against contamination by ordinary steel.

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Through integrated, efficient operation, Sun Ship can reduce costs ... increase your **POTENTIAL**. Call for an estimator or representative.

## SUN SHIP

BUILDING & DRYDOCK CO.  
CHESTER, PENNSYLVANIA

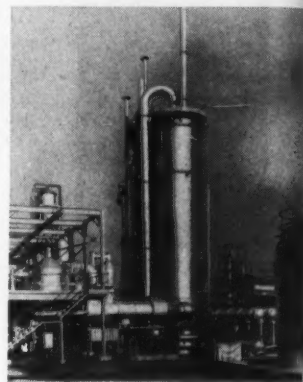


Check 2802 opposite last page

## PETROCHEMICALS

### Formaldehyde production at Montecatini boosted

Montecatini Company is increasing its formaldehyde production from 80 to 135 million lb/yr with the construction of a third unit at Castellanza,



Formaldehyde plant in Italy

near Milan, Italy. Formaldehyde is obtained by air-oxidation of methanol in a process discovered by Professor Giulio Natta. A specially prepared catalyst consisting of a mixture of metallic oxides is used.

### Petroleum chemicals field surveyed on world-wide basis in book

Second edition of book on petroleum chemicals has been enlarged and revised in line with the field becoming clearly established on a world-wide basis. Book was written by Dr. R. F. Goldstein. It contains 458 pages.

Book has an introductory chapter covering the history of petroleum chemicals. Concluding chapter contains economics and statistics on various petrochemical products and development in different countries. Other chapters give detailed information on processes and basic chemistry of them.

(To obtain "The Petroleum Chemicals Industry" remit \$16.50 direct to John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N.Y.)

Check 2803 opposite last page.



# NOW greater economy

LENAPE A.S.A. FLANGE *Plus*

LOW COST WELD END EXTENSION

For many pressure vessel requirements, progressive designers are specifying economical Lenape flanges and seamless weld end extensions in place of more costly long welding necks in I.D. sizes from 16" to 24".

## Check these distinct advantages:

### LENAPE FLANGES OFFER:

- Full I.D. opening for easier access and replacement of vessel internals.
- Wall thickness equivalent to more expensive Seamless Welding Necks.
- Special facings in solid material.
- Positive flange cost economy.

### LENAPE SEAMLESS EXTENSIONS OFFER:

- Full I.D. opening free from constrictions imposed by pipe.
- Heavier walls than either pipe or rolled plate—greater corrosion and pressure resistance.
- No axial seam to be radiographed.
- Inherent reinforcement.

### IN COMBINATION:

- Economy in lengths beyond 12" overall as compared to Seamless Welding Necks.
- Joining weld is X-rayable, in contrast to a slip-on flange.
- Extension may first be welded to vessel, then flange welded to extension without refacing the flange.

Write today for detailed specifications.

**LENAPE**  
PRESSURE  
VESSEL  
CONNECTIONS

See our standard line of pressure vessel connections on pages 1128-1129 in the 1958 Chemical Engineering Catalog.

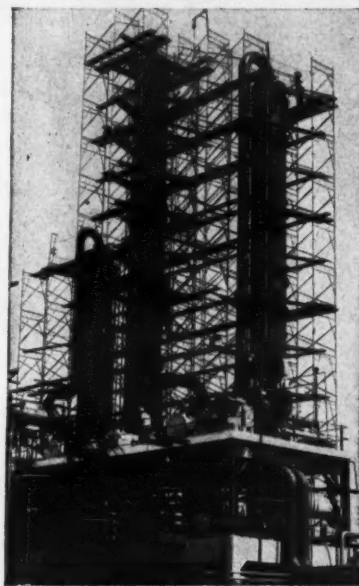
LENAPE HYDRAULIC PRESSING & FORGING CO.  
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RED MAN PRODUCTS

## Scaffolding Methods... by Patent Scaffolding Co.



**MOVE IT AROUND**—For jobs requiring a working surface at a fixed height 3' to 9' above ground or floor level, these aluminum work stands provide the portability of ladders, plus the extra safety and wider application of scaffolding. Ideally suited for reaching hard-to-get-to valves and gauges, inspecting and cleaning tanks, loading and unloading warehoused materials, speeding up a hundred other processing and maintenance jobs. Can be anchored where fixed platforms are required. Platforms of nonskid perforated aluminum vary from 2' to 4' in width, 2' to 8' in length. Special stands for special purposes can be supplied. Write for Bulletin AS-9.



**PREFAB PLATFORMS**—"Trouble Saver"® Sectional Steel Scaffolding is made of prefabricated frames, diagonal braces, bases and adjustable legs. Frames vary from 2' to 5' wide and from 3' to 6'6" high to provide proper heights and widths of working platforms to fit the job. Here, it gives maintenance crews easy, safe tower access.

Complete scaffolding equipment and engineering service offered through nation-wide sales offices or representatives. Look under Patent Scaffolding in the Yellow Pages for your nearest source.

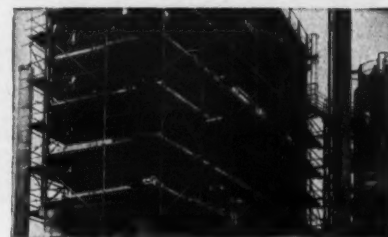
### SALES

### RENTALS

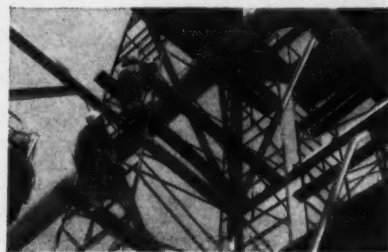
FOR GREATER SAFETY...EFFICIENCY...ECONOMY

**THE PATENT SCAFFOLDING CO., Inc.**

38-21 12th St., Dept. CP, Long Island City 1, N. Y.  
West Coast: 6931 Stanford Ave., Los Angeles 1, Calif.  
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Branches in all principal cities.



**AT EVERY LEVEL**—Versatile, all-purpose "Tubelox" Scaffolding provides working platforms at every level on coke drum and pipe still sections. Minimum wood staging is required.



**EASY ACCESS**—To get up and around heater units, workers quickly assemble "Trouble Saver" Scaffolding frames to exact heights. Built-in ladders speed the job by providing fast, easy access. Wood planks give necessary staging. 100% recoverable, "Trouble Saver" and "Tubelox" Scaffolding can be economically used indefinitely on many types of jobs.

## CLIP COUPON TO YOUR LETTERHEAD

Send me literature on:

- ☐ "Tubelox"  
☐ "Trouble Saver"

Your

Name .....

Check 2804 opposite last page

Check 2805 opposite last page

# ENGINEERS "DISCOVER" ALCOA CONDUIT

Lower cost, installation economies, corrosion resistance make Alcoa Aluminum the best conduit buy. An increasing number of cost-conscious engineers are switching to aluminum rigid conduit for office buildings, industrial plants and other new and remodeled structures. Here are some of the reasons why:

- Lower prices plus light weight and ease in handling make Alcoa Aluminum Conduit installations competitive.
- Corrosion resistance of aluminum means less maintenance, freedom from staining.
- Aluminum is easier to cut, bend and thread. Wire pulling is easy, too, because of specially treated internal surface.
- Nonmagnetic aluminum offers up to 20 per cent less voltage drop.

- Clean, modern appearance complements modern architecture.
- Aluminum is nonsparking and has Underwriters' Laboratories, Inc., approval.

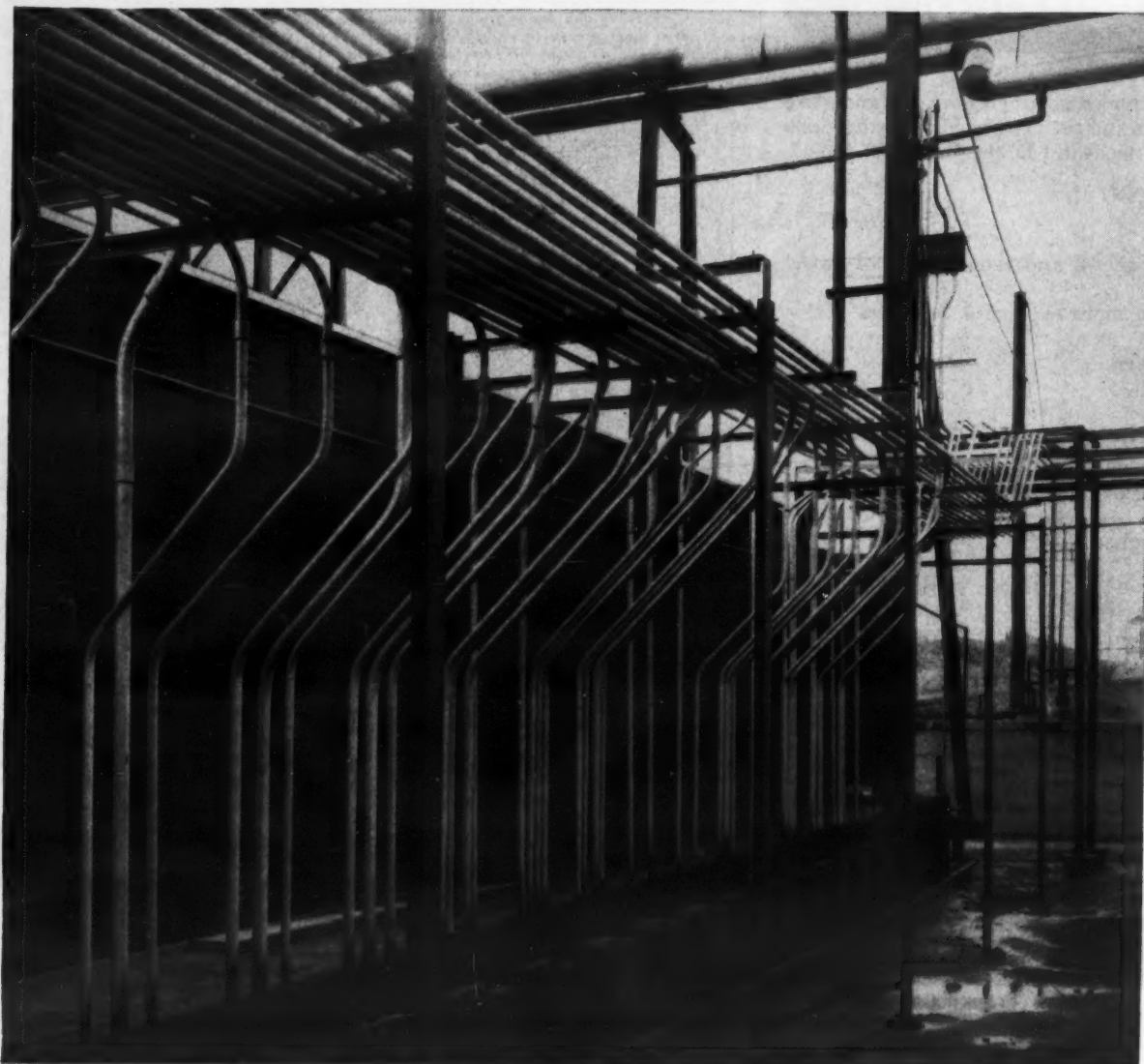
Find out why Alcoa® Aluminum is your best conduit buy. Contact your electrical distributor, or write Aluminum Company of America, 2323-M Alcoa Building, Pittsburgh 19, Pennsylvania.



Your Guide to the Best in Aluminum Value



Spencer Chemical Company, Pittsburg, Kansas



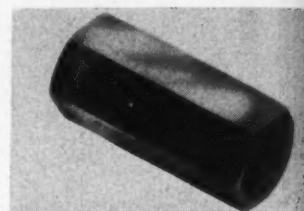
Check 2806 opposite last page

## PETROCHEMICALS

### More consistent flow with control valve

Uses: For hydraulic and gas applications.

Features: Design of unit permits increased flow, greater dependability, and marked reduction in friction. Metal-to-



Sensitive adjustment of valve is made possible by design which controls valve-ball rather than the passage

metal seats and "free-ball" mounting assure lower maintenance costs and more consistent flow.

**Description:** Flow control valves are female threaded to dryseal specifications in standard IPS from 1/8 to 3/4". They are available in brass, steel, aluminum, stainless, and special alloys. Valves may be used up to 2000 psi.

Because there are no internal gaskets, springs, or hinged parts, valves are particularly adaptable to extremely high or low temperatures.

(Flow control valves are product of True-Flo Valve Div., Mystic Machine Co., Inc., 79 Bow St., Everett 49, Mass.)

Check 2807 opposite last page.

**Automatic pilot plant,** computer-controlled and built to scale, is described in four-page bulletin. Called a micro-plant, system is said to be small enough to fit in the average office. Bul 3013 — Systems Div., Consolidated Electrodynamics Corp., 300 N. Sierra Madre Villa, Pasadena, Calif.

Check 2808 opposite last page.

**Vapor adsorption units** for continuous removal of hydrocarbon vapors, emulsions, and dirt are described in 10-page publication. Units covered protect air and gas systems from foreign products. Bul SC-1047 — Selas Corporation of America, Dresher, Pa.

Check 2809 opposite last page.



## Expansion Through Know-How

From page 28

ing company, it must be remembered such a firm in the chemical process field first looks upon all operating chemical companies as potential clients. In its aggressive pursuit of work, it usually will have established wider contacts than most American operating companies. Because of this, the American engineering company which operates abroad is frequently able to unearth a source of desired know-how by reference to its contact files, thereby saving the operating company time, effort and money in its search.

Probably the most important practical advantage is an engineering company's intimate knowledge of American engineering standards, process equipment and design factors.

### Experience Counts

The engineering company which has designed foreign plants on the basis of U.S. know-how, and, conversely, has engineered plants in this country based on know-how from abroad, will be able, most effectively and in the shortest time, to translate a foreign chemical operation into a successful American plant, incorporating the most up-to-date American technology and design methods. In particular, the very high degree of advancement of American chemical engineering makes the chemical engineering contribution of the American engineering firm of vital importance in the translation of a process to the U.S.

### Deal Directly

On the other hand, if an operating company wishes to obtain an exclusive position on a process, it is certainly more likely that this can be achieved by dealing directly with the foreign source despite the fact that engineering companies can and do participate in exclusive or semi-exclusive arrangements.

The engineering firm depends heavily upon repeats, and generally, as a matter of self-interest, will at least not encourage one-of-a-kind installations. Furthermore, some

foreign operating companies are not yet educated to the role of the engineering company in the transmittal of know-how, or indeed to the professional character of the U.S. engineering firm, and may be reluctant to deal except directly with operating principals.

We believe that as the engineering company continues to demonstrate its usefulness in this matter of know-how exchange this reluctance will be overcome, and the foregoing difficulties mitigated.

### Cause for Confusion

However, let us issue a word of caution about procurement of foreign process know-how through engineering companies when none of them is a recognized U.S. representative for the process involved. In such a case, endless confusion and misunderstanding, to the extent of seriously jeopardizing the entire project in some instances, can result when an operating company requests two or more competing engineering companies to go about procuring the process from abroad.

The foreign company, when approached by several engineering firms for a single U.S. client, quite naturally will object not only to the excessive time and effort required for such multiple negotiations for a single potential sale of know-how, but also to such widespread disclosure of information on the process. Also, the foreign company will hardly relish the prospect of getting into the middle of a tug-of-war among several competing engineering firms.

### Choose One Company

We strongly recommend that the operating company choose one qualified engineering company to perform the overseas negotiations, and to execute the project when the deal for purchase of know-how has been consummated.

Acquisition of know-how from abroad has enriched our chemical industry by the flow of technology from our world neighbors since the close of

## Stretch maintenance dollars...



by *Repairing* corroded concrete

with  
**NEW**

# Penntrowel

## SURFACING COMPOUNDS

Next time you're faced with badly corroded concrete, brick or cement surfaces in your plant, call for PENNTROWEL corrosion-proof surfacing instead of a jack-hammer crew.

**Unmatched chemical resistance and toughness.** PENNTROWEL packs triple power... combines high chemical resistance, impermeability and inseparable bonding. It gives long, rugged service, with no cracking or sloughing off.

**Fast, economical repair.** You mix as much PENNTROWEL mortar as you need, right at the jobsite... then just trowel it on. It cures overnight, is ready for service the next day. And its cost is amazingly low!

PENNTROWEL corrosion-proof surfacings have been proved on the job in Pennsalt's own fluorine, chlorine and caustic plants. Three grades give top performance in any corrosion or wear application.



*Write Today*

for PENNTROWEL folder CP-627  
and installation cost data.

Corrosion Engineering Products Dept. 654  
**PENNSALT CHEMICALS CORPORATION**

Natrona, Pa.

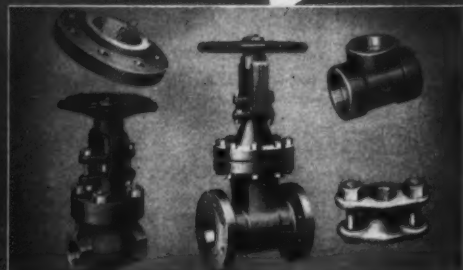
Penntrowel is a trade-mark of Pennsalt Chemicals Corp.



Check 2810 opposite last page



# Vogt PRODUCTS



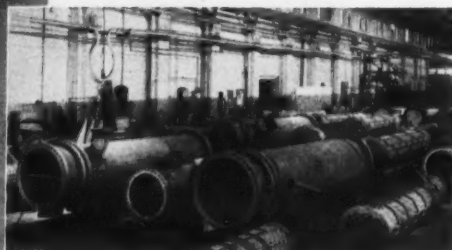
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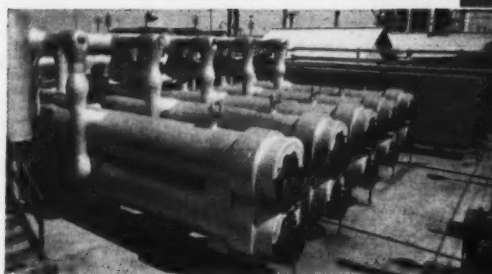


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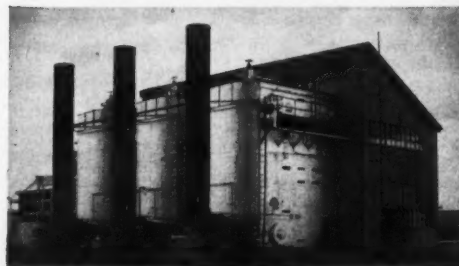


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## Expansion Know-How

From preceding page

World War II. While the post-war years have seen exportation of U.S. technologies at a somewhat greater rate than importation of techniques from abroad, this trend is changing as chemical process industries of Europe and Japan grow strong and devote more of their energies and resources to research and development in new fields and new products.

If, as we believe probable, there is in the offing a balance of trade in the traffic in technologies between the U.S. and other industrialized nations of the Free World, it will be an important contribution to the achievement of mutual respect and understanding between ourselves and our democratic neighbors.

## Pesticides

From page 29

that 5 million lives have been saved in the United States since the end of World War II through control of disease-carrying insects. Uncle Sam is contributing 5 million dollars to the World Health Organization in an all-out war on the Anopheles mosquito to eradicate malaria throughout the world, using DDT as the principal insecticide.

Department of Agriculture experts estimate that without pest-controlling chemicals, United States food production would be approximately half of what it is today, and would unquestionably be of much lower quality.

Pesticide chemicals' greatest accomplishment has been to put into man's hands a mastery over many pests which have destroyed his food and killed him and his family through famine or disease since the beginning of time.

## Research Ignored

Yet there are those who will easily sweep the public into open hostility to chemical products, such as pest controls, by crying: "How do you know you have tested it enough to

Check 2811 opposite last page

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be sure it won't harm people?" This line of questioning ignores the three to five years of research which assures that each new pesticide chemical is effective and safe. Federal and state laws require thorough pre-testing before sale, and strictly regulate the sale and use of these products.

Some newsmen, principally outdoor writers, have been led to believe that insect eradication programs will kill all the wildlife in a treated area. Their fears are natural but, according to the federal and state agencies in charge of these programs, unjustified.

The USDA feels that these programs should be weighed by a judgment of values: The eradication of a pest against the loss of some wildlife, a loss that the USDA says will be offset within a year.

In a step toward better understanding of the wildlife problem, Congress recently passed a bill appropriating \$280,000 a year for research on this question. The National Agricultural Chemicals Association backed the bill.

### Reputation at Stake

As we in the pesticide-chemical manufacturing branch of the chemical processing industry see the present situation, the issue is not yet fully decided by the general public. But there's no room for doubt that the reputation of the industry is involved. To the extent that public respect for responsible scientists and public confidence in the chemical industry are strengthened, the more certain is our hope for a better public understanding.

### 'Odd Ball' & Research

From page 30

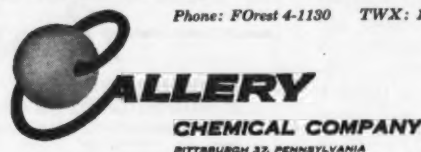
opinions and recommendations. It would not be advisable at this time to encourage discussion of details as to how individuals would propose to work. Primary purpose of discussions would be to develop clearly individual opinions,

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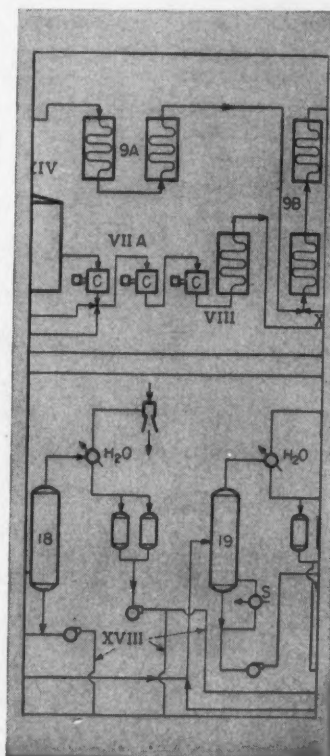


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Check 2814 opposite last page

Check 2812 opposite last page



## 'Odd Ball' & Research

From preceding page

and to determine whether there is a consensus of opinion. It is imperative that the group understand that consensus is not to be considered restrictive, but that it has been expressed for whatever value individuals may derive from it.

4. With groundwork established, it is basic to this philosophy that individuals understand their responsibilities will be two-fold: They likely will be asked to lend assistance of a service or consultative nature to other team members, or by the same token, they are free to avail themselves of equivalent assistance from others on team.

5. With preliminary objectives accomplished, acting chairman should then appoint a permanent group leader after it has been ascertained whether the evidence indicates the project will involve primarily a specific individual or department. If the former is so, this man should be appointed as group leader. But if no single scientific discipline is predominantly involved, a group leader should be chosen by the chairman from the group.

### 'Ground Rules'

6. The permanent chairman or leader should then begin operating on these "ground rules":

- (a) He will neither demand nor dictate agreement or compromises on basis of authority, but rather through free discussion with individuals of controversial issues. He must make it clear group discussions are for exchange of ideas, points of view and presentation of progress reports. Use of any part of reports will be left to discretion of individuals.
- (b) Determine and maintain a record of team's progress within a pre-determined time schedule, and keep team within budget provisions.
- (c) Prepare periodic progress reports to management in order to circumvent personality conflicts, but without requiring acquiescence from non-conformists. A practi-

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Check 2815 opposite last page



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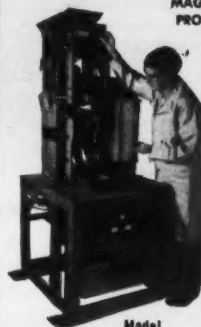
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Check 2818 opposite last page

cable way to do this is to permit team members to read and comment upon a preliminary draft. Should there be individual differences of opinion or strong disagreements, individuals should be permitted to submit a minority commentary to the group leader for inclusion in the report.

### Leader Is Liaison

7. Group leader will be liaison with designated management supervisor. He will include in reports specific recommendations regarding further management action.

Management policy must emphasize selection, training and support of individual leadership. This must consist of eight primary attributes and skills in addition to the more commonly available characteristics.

These eight attributes are: A highly developed degree of perceptiveness; genuine respect and regard for importance of individuals; personal and professional integrity; genuine humbleness in a framework of self respect; self control; objective open mindedness; pertinacity of design, and continuity of purpose.

It is my considered judgment that uncommon and highly desirable creative contributions of independent and unorthodox thinkers can be brought to bear upon team research through approach outlined above.

### Realistic Premise

A contingent premise which I have found to be realistic and sound is based upon the "odd ball" himself — specifically, that the highly educated, inventive scientists of non-conformist bent is, nonetheless, an intelligent person.

Once it has been demonstrated through deeds that management does not propose to coerce him into unwilling conformist servitude, he will recognize obvious advantages not only to himself but also to his colleagues of the stimulation of opposing ideas and points of view.

As a scientist, he will have

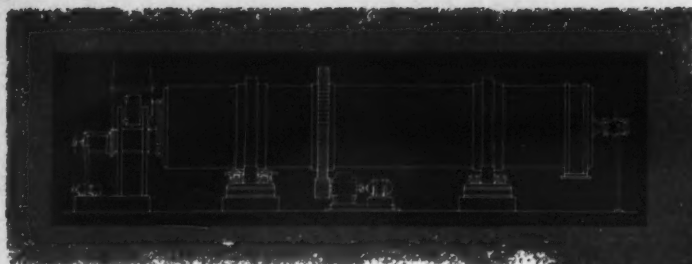
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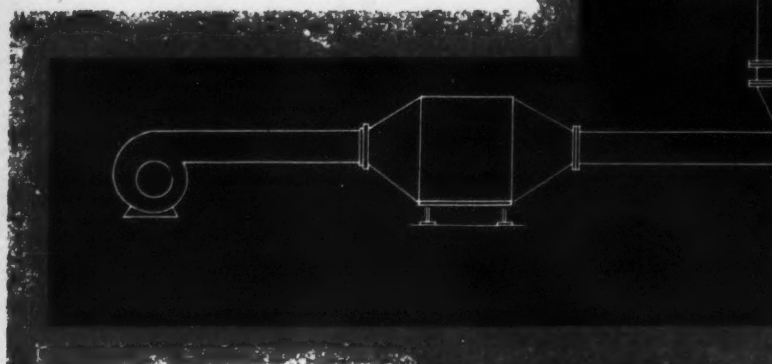
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Check 2819 opposite last page

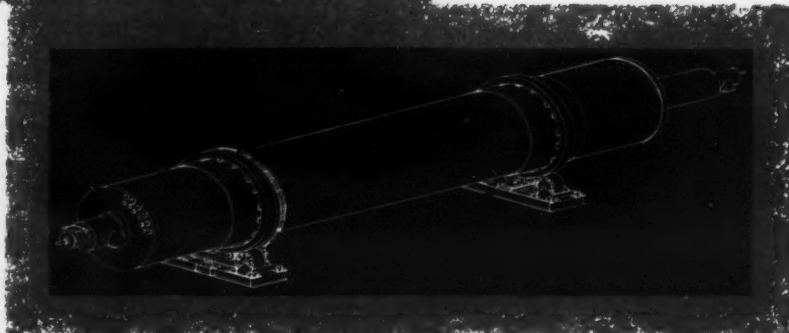


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## 'Odd Ball' & Research

*From preceding page*

respect for the particular competencies of his fellow workers. He will recognize that these can be sources of strength to him rather than obstacles to his self-expression and self-determination.

This discussion is not intended to imply that team or group research always is or often is the best way to handle most research and development projects. I believe team or group research should only be considered when the complexity of the problem and variety or scope of component specialized disciplines make it virtually mandatory.

## Technical Exchange

*From page 31*

man relations when men can sit down and talk over problems in a common language without having to depend upon an interpreter. Conversing through an interpreter often results in misunderstanding because of the use of idioms and other figures of speech difficult to translate into another language.

### Be Precise

A vital point to consider when dealing with persons of another tongue is to be as precise as possible in order to avoid lingual misinterpretations. Serious complications sometimes can result from a few words not properly understood.

Actual wording of an agreement can constitute a major pitfall. It is of vital importance that language of the agreement is precise on all points so that there will be no subsequent misunderstanding by either party. A poorly worded agreement sometimes can undo all the good will that has been built up during exploratory discussions.

The fact still remains, however, that whatever type of licensing agreement is worked out, it is no better than the feeling of close relationship which went into it.



**IDEAS:** from other industries and nuclear field  
— new trends in research, processes, services

**Graft polymerization is proving economically feasible in a number of applications. Development of improved processes is likely to reduce costs considerably and thus encourage use of the technique . . .**

## Here's Graft Polymerization . . .

**IT'S ON THE BRINK OF COMMERCIAL EXPLOITATION**

**DR. H. GEORGE HAMMON**  
Battelle Memorial Institute  
Columbus, Ohio

Dr. Hammon, currently investigating graft polymerization by irradiation at Battelle Memorial Institute, has participated in studies of other polymerization techniques. Prior to his association with Battelle, he had been responsible for research on foam polyurethane materials at Hudson Foam Plastics Corporation. Earlier, he directed studies of foam plastics at Ivano, Inc.

**I**N the few years devoted to research on graft polymerization, scientists have already found many potential advantages to be gained from use of the technique. A number of patents have been granted in the field. More are certain to follow in the next few years. The industry seems on the brink of commercial utilization of the technique in isolated cases.

Graft polymerization has proven economically feasible in a number of applications. And development of improved processes will likely reduce costs even more and thus encourage its use. Where a graft polymer can be made by more than one method, the most

economic will, of course, be preferred.

For example, if a graft polymer could be made at moderate cost by polymerization technique, there would be no point in utilizing expensive radiation procedures. On the other hand, the special advantages cited for grafting by irradiation assure it a place in plastics chemistry.

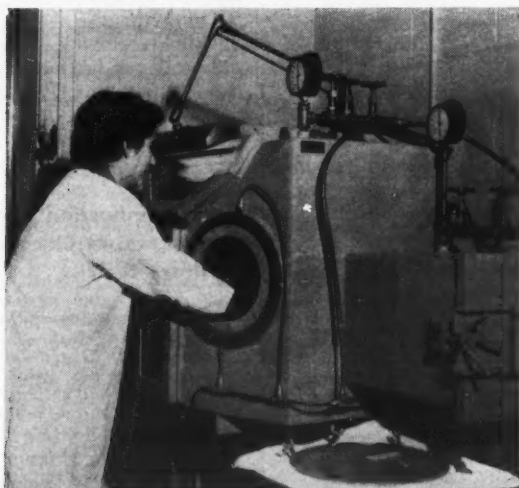
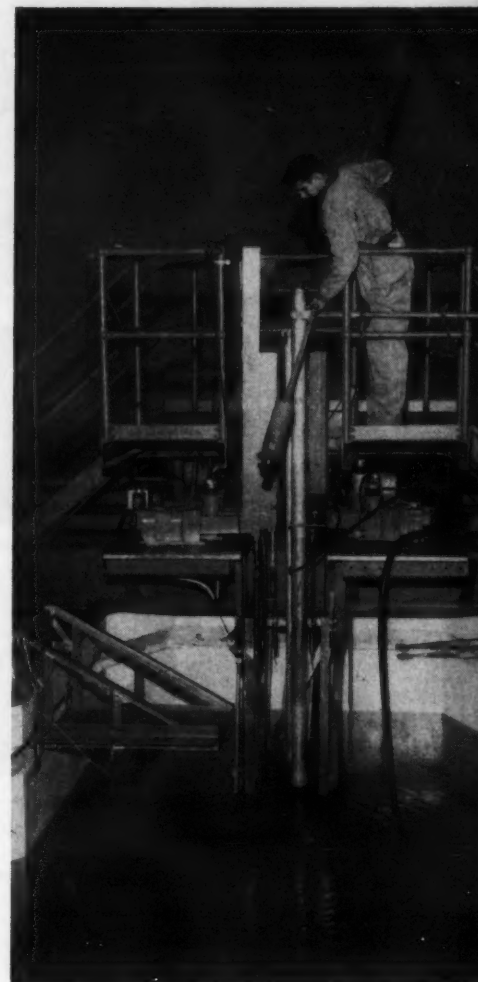
### What's Graft Polymerization?

The term "graft" was borrowed from horticulture. Just as the horticulturist makes plant grafts, the chemist joins chemically two or more dissimilar polymers.

Of the many ways for carrying on graft polymerization — ionic polymerization, condensation or addition reactions, irradiation — graft polymerization by radiation may prove to be exceptionally valuable. Why?

Graft polymerization by radiation offers a means of chemically altering a preformed synthetic or natural polymer without changing its physical shape, and often without destroying many desirable properties. Thus, a hydrophilic surface, which serves as a conductor, might be grafted to a hydrophobic

Lowering a "weazel tube" or capsule, which contains the polymer specimen for irradiation, into a pool of Battelle's research reactor. Specimen is placed close to reactor core so that it will receive the fullest possible irradiation



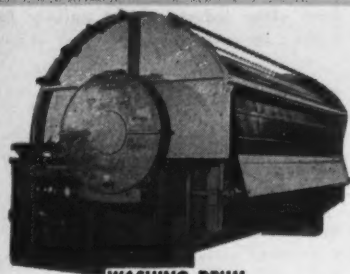
Preparing polymer samples in inert atmosphere prior to irradiation

film or fiber to reduce the tendency of synthetic material to accumulate a static charge.

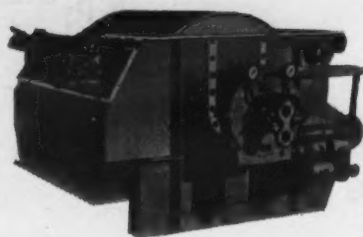
By grafting of selected monomers to some of the newer, synthetic fabrics, it may be possible to improve the receptiveness of these fabrics to dyes. Similarly, treatment of plastic films may improve their printability.

Some interesting materials have already been produced. The grafting of acrylonitrile





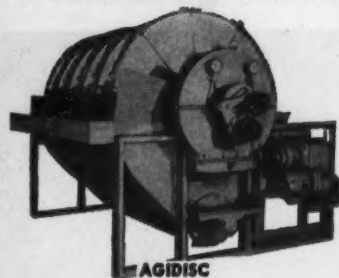
WASHING DRUM



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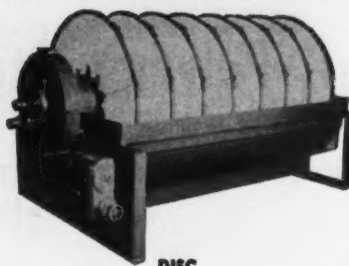


ROTOBELT



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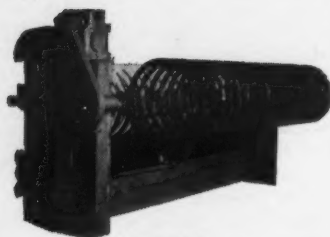
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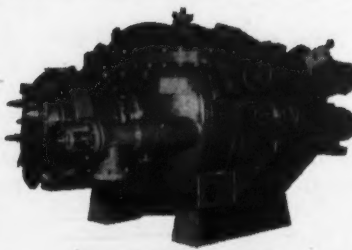
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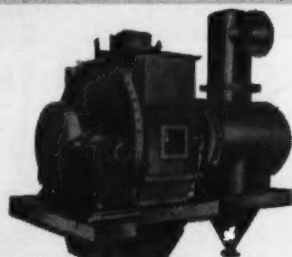
PRESSURE DRUM



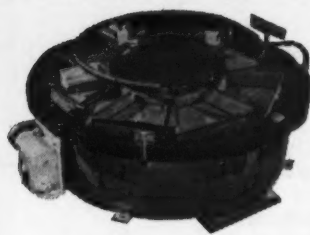
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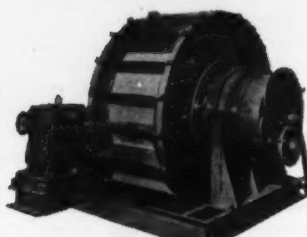
PRESSURE PRECOAT DRUM



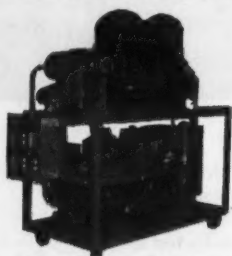
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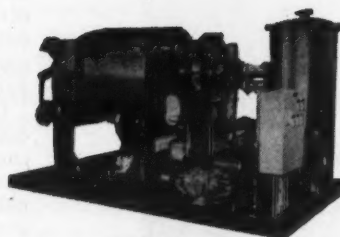
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B-302

### IDEAS

to polyethylene reduces the swelling of polyethylene in aromatic hydrocarbons, raises its softening range from 110° to 160°C, and provides an excellent surface for adhesion to many polar materials such as cellophane.

Small quantities of acrylic esters grafted to polyethylene, after hydrolysis, prevent the accumulation of static charges. Styrene-grafted polyethylene can be sulfonated to yield a cation-exchange membrane. Styrene grafted to the surface of Teflon improves the adhesion of other materials to Teflon by conventional adhesives.

Another example is the reaction of acrylic or methacrylic acids with cotton and use of the products as sites for graft polymerization. Treatment of cotton by these procedures is said to improve shrink- and crease-resistance. The procedure may even impart a glossy appearance and a different feel or "hand" to the product.

### "Living" Polymers

Work at the Syracuse State College of Forestry under the direction of Professor M. Szwarc has introduced the interesting concept of "living" polymers. By carrying out the polymerization of an anionic material in a non-acid solvent, a polymer is formed and is not "killed" in the usual manner. The polymer continues to grow as long as it has monomer "food". If supply of monomer is exhausted, the growth is interrupted, although the "living" ends are potentially able to grow further if an additional amount of monomer is made available.

### "Wet combustion" process passes test at Chicago's Sanitary District

Two-ton-per-day pilot plant operated for over a year

Disposing of municipal sewage by the Zimmermann "wet combustion" process (see CHEMICAL PROCESSING, June 1957, page 78) seems to be

Check 2821 opposite last page

practical and economical. Results based on more than a year's operation of a two-ton-per-day pilot plant at the Chicago Sanitary District, indicate that process may be the key to vexing problems connected with sewage disposal.

The city is considering erection of four such plants, each having capacity of 50 tons sewage sludge per day. Capital cost would be between 6 and \$8 million, compared to \$25 million for conventional disposal plants of same capacity. Operating cost would be 10 to \$12 per ton sludge solids, instead of about \$45 per ton for conventional methods.

Other advantages cited are big reduction in space required for plant and no odor or air pollution. Based on the tests, reduction in chemical oxygen demand is about 80 percent. Volatile solids are reduced approximately 87 percent. Effluent is easily treated by returning it to aeration tanks or to trickling filters. Ash remaining is inert and odor-free, having sp gr of 2.23.

Process bypasses need for conventional filters, chemicals, sludge digestion units, incinerators, and auxiliary equipment. It was developed by Sterling Drug Inc., and patents and patent applications cover its functions. Large commercial plant is almost completed in Norway. Process will convert waste pulp liquors into steam, producing about 236,000 lb steam per hr in excess of that needed to operate process.

(Further information about Zimmermann Process may be obtained from Sterling Drug Inc., 1450 Broadway, New York 18, New York.)

Check 2822 opposite last page.

**Cobalt instruction sheets** — One of two new instruction sheets provides four pages of macroetching and microetching instructions for cobalt and its alloys. The other instruction sheet lists eight solutions for use in chemical and electrolytic polishing of various cobalt alloys. Time, temperature, and voltage are specified. Instruction sheets on cobalt may be obtained by letterhead requests to Cobalt Information Center, c/o Battelle Memorial Institute, 505 King Ave., Columbus 1, Ohio.

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Standard inclined screens

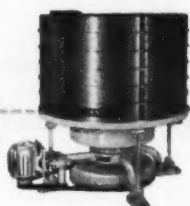
... up to 5 inches.  
(Shown with air springs.)



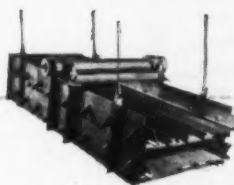
# SCREENS

world's most complete line!

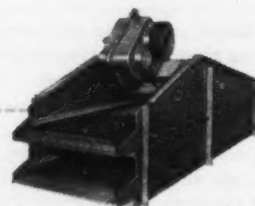
separations from 12 inches to 325 mesh



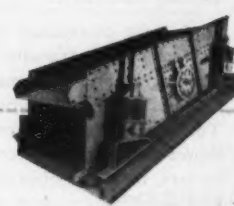
All-metal gyratory screens  
... 2 to 325 mesh.



Small inclined vibrating screens  
... 1 1/2 inches to 40 mesh.



Horizontal vibrating screens  
... up to 2 1/2 inches.



Heavy duty scalping screens  
... up to 12 inches.

**Expert application help.** Allis-Chalmers not only offers the most complete line of dependable, high-production screens, but also provides expert counsel based on unequaled experience in screen applications. In addition, modern pilot plant facilities are available for test runs of difficult or untried materials, if necessary.

For your copy of valuable screen selection guide, 25C6177M, write Allis-Chalmers, Industrial Equipment Division, Milwaukee 1, Wisconsin.

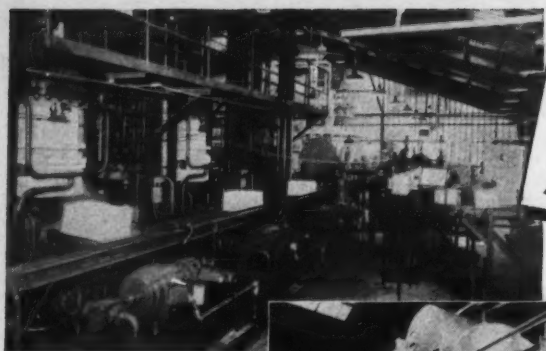
- Suspended or floor mounted, or supported on air springs.
- Inclined or horizontal.
- Electrical and mechanical anti-blinding devices.
- Screens designed for special applications.
- And you get your screen complete with motor, drive and control — all built by Allis-Chalmers.
- Wet or dry operation.
- Screens for hot materials handling.
- Dustproof enclosures.

**ALLIS-CHALMERS**



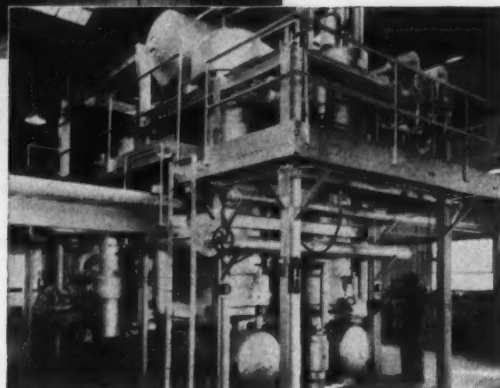
A-5819

ALLIS-CHALMERS



Each of the Cardox Corporation's three presses forms 240-lb. cakes of dry ice in 5½ minutes.

At Cardox Corporation's modern Memphis, Tennessee plant, Vilter vertical condensers change carbon dioxide gas into liquid. Vilter supplied a total of 18 custom designed vessels of which several are shown here.



## 100 tons of CO<sub>2</sub> produced per day using 18 Vilter pressure vessels

Using a new low pressure process, the Cardox Corporation's Memphis Plant turns out 100 tons of CO<sub>2</sub> per day. Plant operation is almost entirely automatic.

A large percentage of the major processing equipment is devoted to efficient heat transfer. Among these are eighteen custom-made heat exchangers and condensers manufactured by Vilter. Typical units include: Shell and Tube type ammonia-cooled condensers, Shell and Tube type water-cooled vapor cooler (all aluminum construction), liquid receivers, aftercoolers, condensers, oil separator, flash intercoolers, and ammonia surge drum among others. The largest Vilter unit supplied provides a heat dissipation capacity of 2,242,000 BTU per hour.

Vilter has successfully resolved many problems of cooling under both low and intense pressures; and has designed and produced hundreds of heat exchangers, pressure vessels, and high pressure synthesis condensers to exacting specifications for many types of chemical and petroleum applications. Vilter heat exchangers are efficient, reliable, and thoroughly inspected and tested prior to shipment.

Consult with Vilter about your heat exchanger needs.

Write for these helpful bulletins to  
The Vilter Manufacturing Company, Dept. CP-808,  
2217 S. First Street, Milwaukee 7, Wisconsin

# Vilter®

REFRIGERATION and AIR CONDITIONING

THE VILTER MANUFACTURING COMPANY, Milwaukee 7, Wisconsin

Air Units • Ammonia & Freon Compressors • Booster Compressors • Baudelot Coolers • Water & Brine Coolers • Blast Freezers • Evaporative & Shell & Tube Condensers • Pipe Coils • Valves & Fittings • Pakice & Polarilake Ice Machines



Bulletin 817  
Vilter VMC  
Ammonia  
Compressor



Bulletin 707  
Vilter Condensers  
Brine Coolers  
Heat Exchangers



Bulletin 427  
Vilter  
Industrial  
Heat Exchangers

## IDEAS



Believed to be first industrial installation of its kind in U. S., remote regulation system at Olin Mathieson filtration plant assures high reliability and stability as . . .

THE FIRST KNOWN industrial remote control microwave radio operation in the United States is helping Olin Mathieson Chemical Corporation's plant at East Alton, Ill., to pump water from Mississippi River to firm's filtration plant, three and one-half pipeline miles away, where there is no reservoir for filtered water.

Up to six million gallons of water daily course through the pipeline seven days a week and 24 hours a day. There is no regular "down" period. Water used at plant is mainly for cooling purposes. However, a considerable amount is used in manufacturing processes for washing components with acids and clear-water baths.

Utilizing tones transmitted by high frequency radio energy, microwave system provides for supervisory control of pumps and helps to control flow of water reaching filtration plant.

### Fast Resupply Action

Olin Mathieson officials report that control function has been engineered to point where immediate resupply action occurs on river bank when any measurable amount of water is consumed by any of company's operating components, of which there are three in the East Alton area.

Use of microwaves for pump control was suggested by Olin Mathieson electrical

Check 2824 opposite last page



Fingertip regulation of complex water pumping system is provided in radio dispatch terminal at Olin Mathieson East Alton, Ill., plant

Equipment rack of remote microwave radio system, believed to be first such industrial installation in U. S.



## Microwaves control water pumps

engineers as a way to solve problem of rehabilitating wire-line control cables in use 15 years. Engineers had been seeking effective, economical method of control providing high reliability and safety against false operation of water system.

It was noted that river flood conditions made it difficult and hazardous to service wire lines under former method of controlling pumping station. Poles carrying lines were near area where river flooded. Checkers had to walk length of wires on zig-zag course, part of it through woods, to make certain system worked properly.

Investigation disclosed microwave was 20 percent less

expensive on original costs than cable-type control system, and maintenance would be easier.

### Long Life for Towers

Future cost of keeping microwave equipment in top operating condition will be lower than other methods of control, the company said. It pointed out that microwave towers, for example, will stand considerably longer than poles, whose useful life is 15 years. Additionally, only relatively small parts will have to be replaced occasionally in system.

Microwave system uses two towers, each over 100 feet high. Microwaves travel in

...a highly reactive gas;  
a strong Lewis acid;  
a flame-speed accelerator  
with an extremely high  
heat of combustion -  
**DIBORANE  $B_2H_6$**

5

Diborane, the simplest of boron hydrides, decomposes slowly at room temperature—and more rapidly at higher temperatures—to hydrogen and higher-molecular-weight boron hydrides. It is completely hydrolyzed by water—either neutral or acidified. Diborane burns in air with a green flame to give boric oxide and water (or boric acid).

Applications include uses as intermediate, reducing agent, catalyst and flame-speed accelerator. It can be stored at low temperatures and can be handled safely with suitable precautions. Write for Technical Bulletin C-020.

Phone: FOrest 4-1130 TWX: Perryville, Pa. 117



**GALLERY**

**CHEMICAL COMPANY**

PITTSBURGH 37, PENNSYLVANIA

Check 2825 opposite last page



*Seasons  
Greetings*

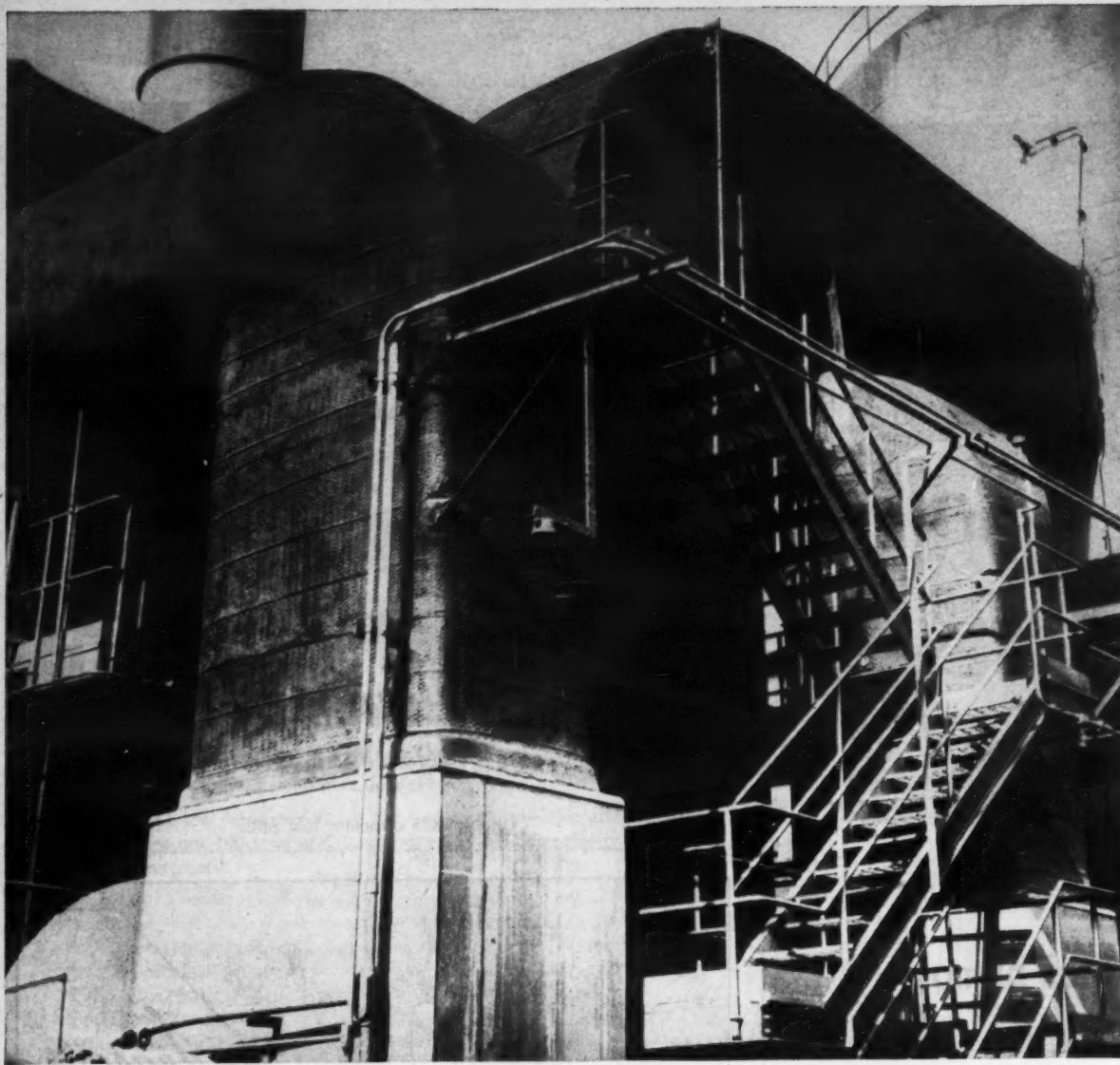
We take time out to  
express our thanks  
and good wishes to all

**MERRY  
CHRISTMAS  
and a  
HAPPY  
NEW  
YEAR**

**CATAWISSA VALVE & FITTINGS CO.**

CATAWISSA • PENNSYLVANIA

Check 2826 opposite last page



**Corrosive atmosphere** of humid salt air makes great demands on such exposed items as insulation netting. South-

ern chemical producer solves the problem by using Monel hex netting as on this magnesium chloride shelf drier.

## Insulation stays up with Monel netting

Hexagon netting of Monel\* nickel-copper alloy stays up in spite of corrosive vapors, moisture, acids,



alkalies and heat that cause other materials to fail.


**And just take a closer look at the photo . . .** notice how the pliability of ductile Monel alloy helps it fit snug around insulation? It's strong as structural steel! This close-fitting support prevents flaking and peel-off . . . keeps insulation in service longer.

**Here's proof of performance:** insulation put up with Monel alloy netting

has now been in service for over 12 years. Many plants show cuts of up to 50% in annual cost of maintaining insulation, by using Monel.

**Next time you insulate,** use Monel hexagon netting — available from Gilbert & Bennett, Georgetown, Conn. They'll be glad to fill in all details . . . supply you with samples and prices.

\*Registered trademark

**THE INTERNATIONAL NICKEL COMPANY, INC.**  
67 Wall Street  New York 5, N. Y.

## IDEAS

line-of-sight paths as opposed to tortuous course following terrain of land underneath, as was case with former system. Consequently, only 1.9 miles of transmission is required compared with three and one-half miles necessary for cable control.

### Two Terminals

There are two terminals in the system—dispatch and remote. Starting and stopping of motor-driven pumps is accomplished by remote control from dispatch plant. Any changes occurring at remote station are shown on an indicator light. A two-way voice circuit facilitates equipment maintenance.

Control for switching, indicating and telephone ringing is provided by tone equipment. Communications are maintained between dispatch and remote terminals by microwave equipment, which is medium for transmitting tone and voice messages. Increased reliability on system is provided by stand-by microwave devices which have automatic switching.

### Tone Signals Selected

Control station for supervisory control system is in dispatch terminal. There, tone signals selected at console are applied to microwave equipment and go to remote points where relays actuate desired mechanical pumping functions.

When desired functions are completed, "return" tone signals turn on indicator lamps at dispatch center, showing operator that task was properly performed.

Any pump condition changes are shown automatically on supervisory control panel. Uninitiated changes activate alarm, calling operator's attention to an unusual condition.

(Microwave equipment was engineered and installed by Communication Products Dept., General Electric Company, Electronics Park, Syracuse, N.Y.)

Check 2828 opposite last page.

# INCO NICKEL ALLOYS

Check 2827 opposite last page

**THAT'S  
INTERESTING**

**'Minuteman'  
all-out**

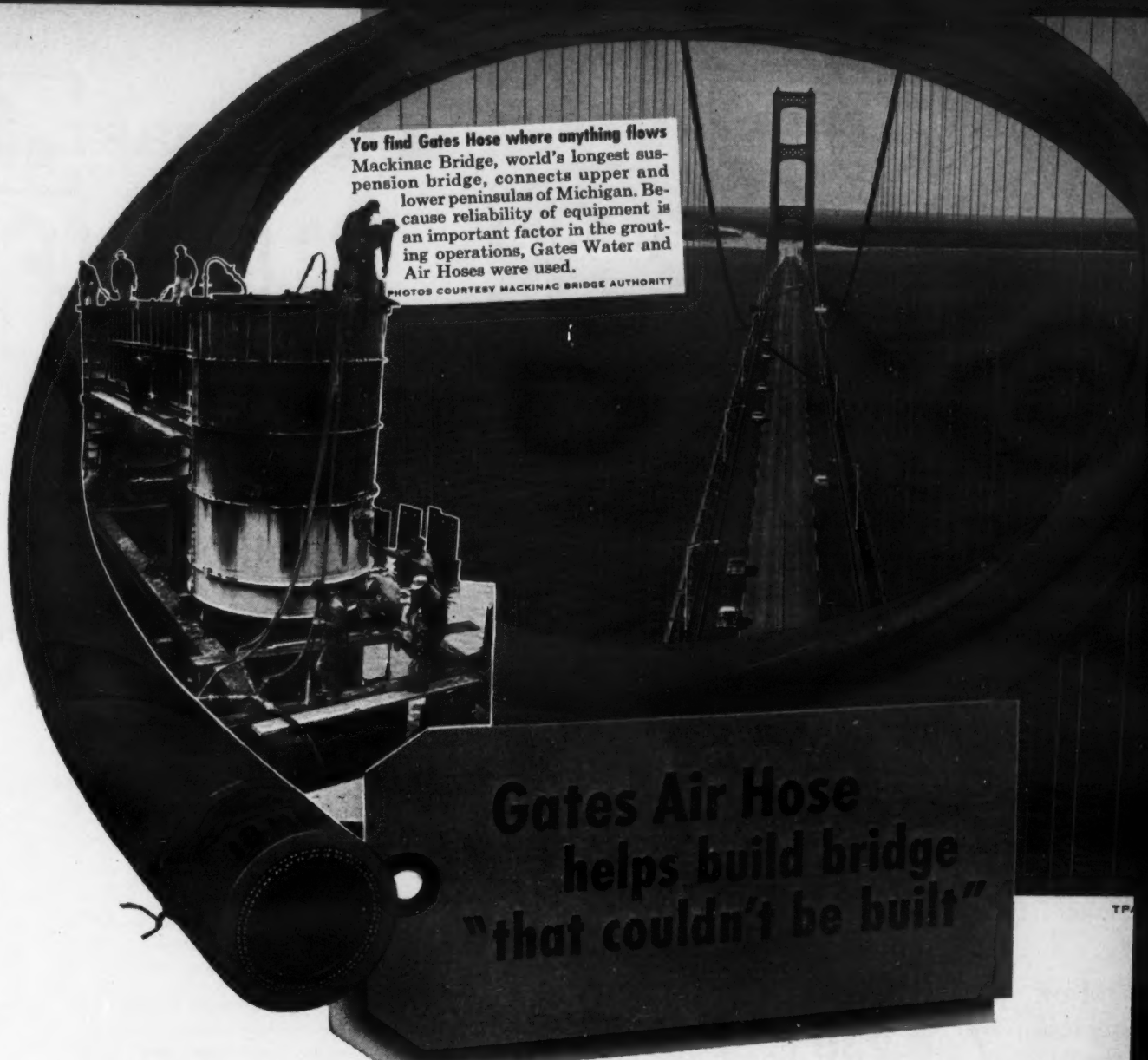
The Air Force's "Minuteman" missile is receiving the undivided attention of Thiokol Chemical Corporation. All research and development facilities of the company have been assigned to work on the three-stage propulsion system for the solid-propellant IBM.

**Mighty in  
demand is he**

The course taught in horseshoeing at California State Polytechnic College in San Luis Obispo has one of the longest waiting lists, and is filled up through the fall of '59.

Cal Poly and Michigan State U. have the only horseshoeing courses in the U.S., and they can't turn out graduate farriers fast enough to meet the demand. One Cal Poly graduate reported he was making \$40 a day. (Westward, Kaiser Steel Corp.)

For more information on product at right, specify 2829 see information request blank opposite last page.



You find Gates Hose where anything flows Mackinac Bridge, world's longest suspension bridge, connects upper and lower peninsulas of Michigan. Because reliability of equipment is an important factor in the grouting operations, Gates Water and Air Hoses were used.

PHOTOS COURTESY MACKINAC BRIDGE AUTHORITY

**Gates Air Hose  
helps build bridge  
"that couldn't be built"**

Industry everywhere depends upon Gates Industrial Hose to provide air, water, steam, oil and suction for every type of application, including some of the toughest jobs in the world.

Actually there are *tens of thousands of miles* of Gates Hose in daily use — every type and size from air hose the diameter of a pencil to petroleum hose as big as the mains in city streets.

Back of the world-wide acceptance of Gates Hose is a continuing program of *specialized* hose research at the multi-million dollar Gates Research Center staffed by more than 200 chemists, physicists, engineers and technicians.

It is the aim of this *specialized* research to increase hose utility and life, and to lower industry's annual hose costs.

Because Gates Hose is so widely preferred, it is quickly available from leading distributors in all industrial centers in the United States and in 90 countries throughout the world . . . and its outstanding performance is guaranteed by the *World's Largest Maker of V-Belts*.

**Gates 18HB Air Hose**, with oil resistant tube and abrasion resistant cover, gives exceptional performance on all heavy duty air usage. This popular hose — one of many in Gates full line — is always available from your nearby Gates Distributor.

The Mark of *Specialized* Research



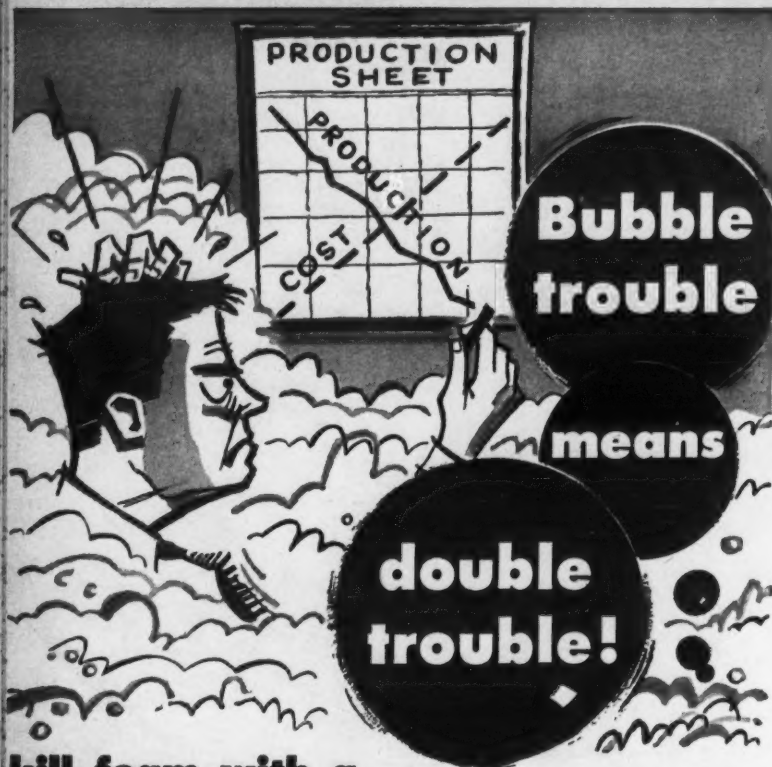
The Gates Rubber Company • Denver, Colorado

**Gates Industrial Hose**

Made in a Full Range of Types and Sizes

XUM





## kill foam with a Dow Corning SILICONE DEFOAMER

Is foam giving you the old "one-two"? One—slowing up your processing . . . two—running up your costs? Fight back hard. Knock out foam fast, with Dow Corning silicone defoamers . . . most efficient foam killers known!

1 oz kills foam in:

- 3,125,000 lb** cellulose slurry
- 62,500 lb** hypo fix and film developer
- 6,250 lb** acetic acid-wood alcohol distillation mix

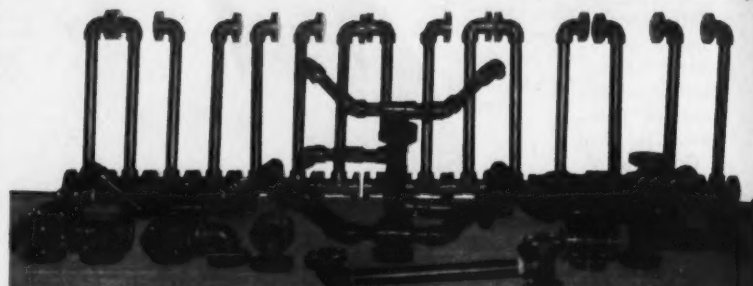
**FREE SAMPLE!** Make your own test. Return coupon below for generous trial sample of a Dow Corning SILICONE DEFOAMER. No obligation, of course.



**Dow Corning CORPORATION**  
MIDLAND, MICHIGAN

NAME _____		3212	<i>My foamer is</i> Oil system _____ Aqueous system _____ Food products _____ Other _____
TITLE _____			
COMPANY _____			
CITY _____	ZONE _____	STATE _____	
Check 2830 opposite last page			

# Fibercast<sup>®</sup> PIPING SYSTEMS



Typical of many Fibercast "Pre-fab Service" jobs assembled from prints for simplified installation.

## PRE-FABRICATED FROM YOUR PRINTS

The money-saving benefits of pre-fabricating assemblies of Fibercast Chemical Piping are threefold:

1. The initial cost for non-corrosive Fibercast piping materials is less than for materials that will corrode.
2. Time and money are saved in having a system pre-fabricated by Fibercast piping experts.
3. You are assured of having long term, maintenance-free operation. **FIBERCAST WILL NOT CORRODE!**

All Fibercast "Pre-fab Service" work is done on a firm bid basis.

This service has been so successful that it has been necessary to quadruple this department in both space and equipment.



### FIBERCAST COMPANY

A DIVISION OF THE YOUNGSTOWN SHEET AND TUBE COMPANY  
Phone Circle 5-1301 • BOX 727 • TWX Sand Springs 480  
SAND SPRINGS (TULSA), OKLAHOMA

Now Available . . . The newly published Engineering Data and Information Bulletin No. 20. Send the coupon for your copy.

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- ☐ Send full information on your Pre-fabricating Service.  
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Name \_\_\_\_\_ Title \_\_\_\_\_  
 Company \_\_\_\_\_  
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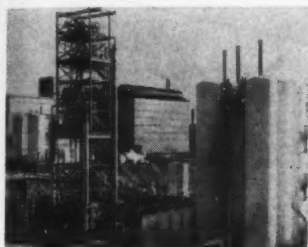
Check 2831 opposite last page

CHEMICAL PROCESSING

**Methylamine plant  
goes on stream  
in Terre Haute**

Many space saving techniques used in plant

Giving the nation's methylamine producing capacity another boost, Commercial Solvents' new plant is now on stream. Located in Terre Haute, Indiana, plant uses continuous process and is reported to be one of the most modern of its kind. Exact ca-



Flanged and screwed joints on pipe are almost entirely eliminated in plant

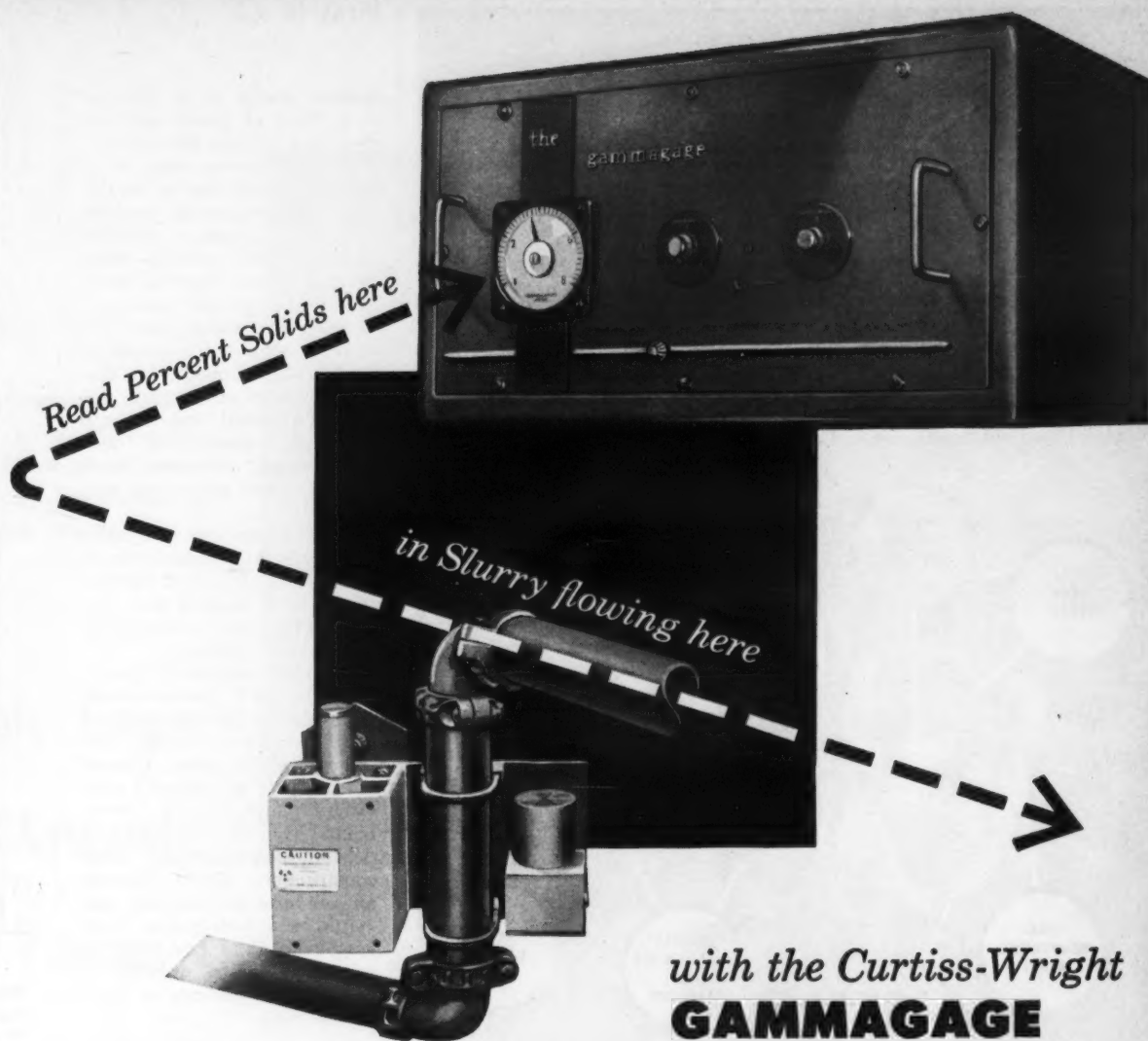
capacity is secret, but company does say it can turn out more than five million lb/yr.

Present U. S. production of methylamines is estimated at 30 million pounds per year. If the new missile fuels using these amines are mass produced for defense needs, U. S. may have to produce as much as 50 million pounds per year.

The Terre Haute plant produces methylamines by reacting methanol and ammonia at elevated temperature and pressure in presence of a catalyst. A mixture of mono, di, and trimethylamine is formed and purified by distillation. Plant is divided into three main sections: Synthesis, distillation, and storage.

Basic design for plant and equipment was provided by an outside process design firm. However, detailed engineering and general contracting of construction was handled by Commercial Solvents' engineering department, using local contractors to do actual plant construction.

Using this technique, estimates are that engineering costs were cut 40 percent. Construction fees were



*with the Curtiss-Wright*  
**GAMMAGAGE**

**Algoma Ore Properties, Ltd. uses this modern  
radiation gage to control its separator medium**

Prior to the installation of a Curtiss-Wright Gammagage, Algoma depended on hand sampling to measure the gravity of their ferrosilicon medium in their sink float plant. Personal errors, and delay in sampling and measurement, did not permit adequate control of the medium.

After installation of the Gammagage on the medium return line from the screen drain, the operator could read the density of the medium at a glance and make immediate adjustments to maintain a constant separator density. This improved efficiency and reduced ore losses. Said Mr. Ferguson, Superintendent of their Sink Float Plant: "We are satisfied that the unit does an excellent job in measuring the S. G. of our medium."

The versatile Gammagage can also be used to measure specific gravity of classifier overflows, thickener under-


flows, feed to cyclone classifiers and many other mill slurries. The measurement signal can be used to operate a recorder or a controller with air or electric output to automatically control dilution valves, pump speeds or pump strokes.

Let us show you how the Density Gammagage can improve the efficiency of your operation.

**WRITE FOR DESCRIPTIVE LITERATURE**

*Industrial Controls Department*

**ELECTRONICS DIVISION**

**CURTISS-WRIGHT** 

**CORPORATION • CARLSTADT, N. J.**

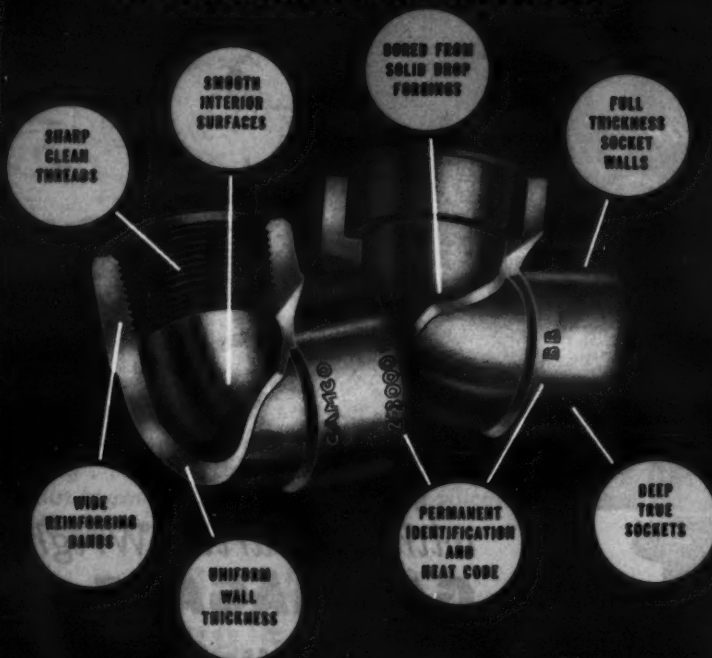
Check 2832 opposite last page

**SPECIFY**

# CAMCO

THE *Quality* LINE  
IN FITTINGS

2000 Lb., 3000 Lb. and 6000 Lb.  
SCREWED and SOCKET WELD  
STAINLESS STEEL FITTINGS



Special non-standard fittings furnished to order . . . One source for all your stainless fitting requirements.

THE *Quality* LINE  
IN FITTINGS

## CAMCO

FITTINGS, INC.

Also available—150 lb. screwed fittings and all schedules of butt-weld fittings.

CAMCO FITTINGS, INC., 301 State Street  
North Haven, Conn. CP

- ☐ Catalog Extra Heavy 657.
- ☐ Catalogs covering complete line.
- ☐ Furnish address of area distributor.

NAME \_\_\_\_\_  
COMPANY \_\_\_\_\_  
ADDRESS \_\_\_\_\_  
CITY \_\_\_\_\_ ST. \_\_\_\_\_

No. Haven, Conn.

WEST COAST AGENT  
AND WAREHOUSE

J. J. GATELEY CO.  
8283 Baldwin Street  
Oakland 21, California

Check 2833 opposite last page

## IDEAS

slashed about 10 to 15 percent. Cost of plant was less than two million dollars.

Because space was at a premium, plant had to be designed as compact as possible. Individual product receiver tanks, finished product storages, and raw material storages are all vertical units, arranged to conserve space. Use of four distillation columns as four corner supports for distillation area condensers, reboilers, control valves, and auxiliary piping also conserved space, structural steel, and shortened piping and wiring runs.

Flanged and screwed joints on pipe were almost entirely left out in favor of welded joints. Even manual and control valves are permanently welded into piping.

Plant is completely instrumented and automatically controlled so that one operator plus a day-time utility man can run entire plant. Control room is air conditioned continuously, permitting instruments, controls, and wiring to be of non-explosion proof construction. Slight positive air pressure on building prevents hazardous fumes from entering. Even smoking is permitted — an unheard of practice in hazardous areas in the past.

(Further information about methylamines may be obtained from Commercial Solvents Corporation, 260 Madison Avenue, New York 16, New York.)

Check 2834 opposite last page.

(Process and equipment design was done by J. D. Leonard & Associates, 437 Fifth Avenue, New York 16, New York.)

Check 2835 opposite last page.

Injection plastic molding facilities available, such as design and engineering department, molding-making department, and press rooms are illustrated in booklet which explains manufacturer's approach to custom molding assignments. Injection Plastic Molding Bul — Makray Manufacturing Co., 4400 N. Harlem Ave., Chicago 31, Ill.

Check 2836 opposite last page.

# ALLIS-CHALMERS



# ALLIS-CHALMERS



## NEW brochure of ideas for modernizing

This booklet is based on the premise that modernization can start anywhere in your plant. It can be a single machine or operation . . . a better way of getting variable speed . . . a faster way to braze . . . or a newly available replacement. In fact, this type of updating is far more common than the sweeping change.

Get a copy of "59 ideas for modernization in '59" from your nearby A-C office or write Allis-Chalmers, Industries Group, Milwaukee 1, Wisconsin.

### Examples of updating!



New motor development may eliminate premiums you've been paying for specially protected motors.

Electrical modernization includes placing substations close to machines being served.

## ALLIS-CHALMERS



A-5850

Check 2837 opposite last page

CHEMICAL PROCESSING





At Tousey Varnish's modern  
Quad-Cities Division in E. Moline, Ill.,  
one instrument turns jack-of-all-trades  
to ease compounding.  
In this all-weight-basis installation . . .

## Simple Gages Weigh All Materials, Including Viscous Liquids, Solids

**THEODORE W. WETT**  
Assistant Editor  
with **DONALD A. RHODE**  
Manager of Manufacturing  
Tousey Varnish Company  
Chicago, Illinois

**PROBLEM:** Combination of weight and volume methods for measuring paint and varnish components often made compounding calculations difficult at Tousey Varnish Company. Volume measurements in particular were troublesome. Since a large portion of raw materials were stored in areas subject to wide temperature variation, volume measurements required continual correction for expansion and contraction.

**Solution:** When company expanded its facilities by erecting a new plant in East

Moline, Illinois, it was decided to make all measurements, including final packaging, on a weight basis.

Plant at East Moline uses liquid and solid raw materials in formulating mostly alkyd-based protective and decorative coatings. Liquid storage is primarily outdoors in tanks ranging up to 10,000-gal capacity. Agitated compounding tanks have capacities up to 4000 gal. In addition, a number of mobile mixing tanks holding 500 gal are transferred from area to area as needed.

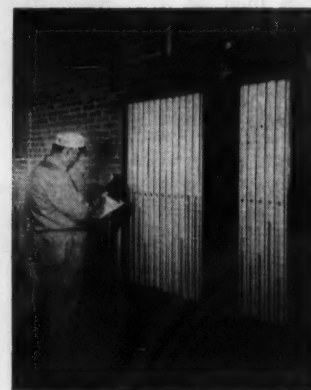
Raw materials, including pigments, vehicles, solvents, extenders, modifiers, regardless of density or viscosity, are measured on a weight basis. A simple, inexpensive hydrostatic gage was picked to fulfill all weighing require-

ments except final packaging.

Gage operates on principle of differential bubbler using a bubble pipe which extends into the liquid. Downpipe is installed in tank and connected through pressure line to high-pressure, indicating-liquid-well side of U-tube gage. Liquid is expelled from downpipe by air.

Pressure created by height of liquid in tank against the air in downpipe is transferred through pressure line to indicating liquid. Pressure forces indicating liquid down in well and up in previously calibrated glass tube where reading is taken.

Equalizer line, connected to top of tank and low-pressure side of U-tube (top of indicating glass tube), forms a closed system permitting operation under conditions of



Central station for tank farm gages. Outage from any tank can be checked against weight recorded "in" during processing

pressure or vacuum. A bubbler system keeps a constant supply of air to both lines to keep liquid out of downpipe and to free equalizer line of vapors.

Weights are read directly from previously calibrated gage. To maintain accuracy, liquids used in smaller quantities are measured in tanks



Operator checks weight of material added to large blending tank from mobile tank. All blending operations are controlled on a weight basis

Even solids can be weighed with gage. Simplicity of gage's operation permits use of these mobile tanks. Only connection needed is to a compressed-air line

having greater height and smaller diameters. This permits graduating the gage in smaller increments.

#### Solids Measurement

For formulations requiring solids, such as pigments, gage is equally effective. Liquid components are added to formulating tank first and weight recorded. Solids are then added. Gage indicates actual weight added, liquid or solid.

All gages for storage tanks are centrally located about 200 feet away from storage area. For mobile tanks and compounding tanks, gages are mounted directly on vessel. Only a compressed air line is required for gage operation.

**Results:** Tousey Varnish Company has achieved an accurate and relatively inexpensive means of measuring materials for varnish and paint formulation. Entire system, amounting to some 35 gages, was installed for slightly less than \$8000.

Operator can read directly on gage the amount of material being fed into compounding vessel. This can then be checked against weight outage shown on corresponding storage tank gage. Although quantities handled are usually large, weights as low as 2½ lb can be measured. Accuracy for most measurements is approximately ½ to 1%, well within specification requirements.

Recipe system is used in formulating. Operator can add required amounts of any material and read weight added directly on gage. No correction calculations are necessary. Additions can be made, and readings taken, even during continuous agitation.

(Gage is a product of King Engineering Co., Ann Arbor, Michigan.)

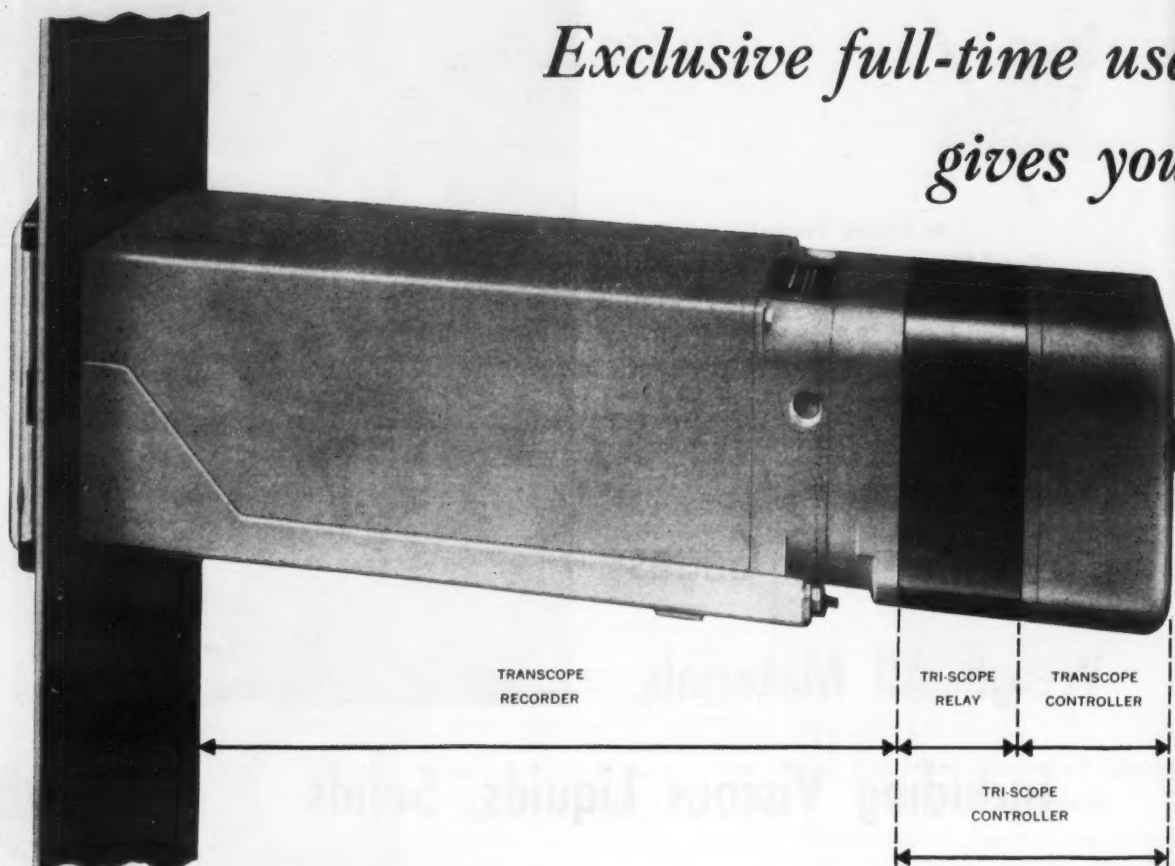
Check 2838 opposite last page.

Laboratory furniture is described in 4-page bulletin. Illustrations show how flexible work centers can be built from standard units. Form 2417 — Columbia-Hallowell Division, Standard Pressed Steel Co., Jenkintown, Pa.

Check 2839 opposite last page.

# NEW TAYLOR

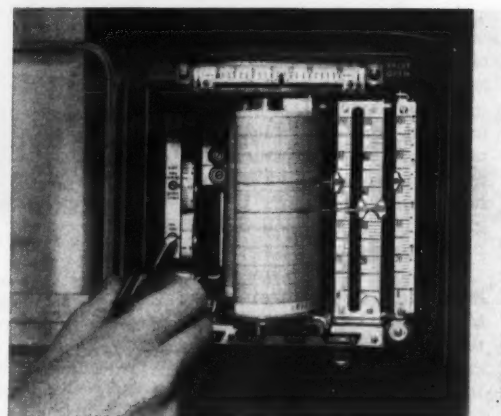
*Exclusive full-time use  
gives you*



#### DESIGN FEATURES

- Plug-in construction.
- Response adjustments made from front or back of panel.
- Mounts neatly between TRANSCOPE Recorder manifold and TRANSCOPE Controller.
- Can be added whenever process changes require it.
- Either field or panel mounting available.
- Uses standard TRANSCOPE parts.

\*Trade-Mark



90J SERIES  
TRANSCOPE RECORDER

# Taylor Instruments

# TRI-SCOPE\* CONTROLLER

*of derivative-ahead-of-reset response†  
these three important features*

- 1 - Start up without overpeaking**
- 2 - Recovery from large load changes  
without overpeaking**
- 3 - Superior control following normal load changes**

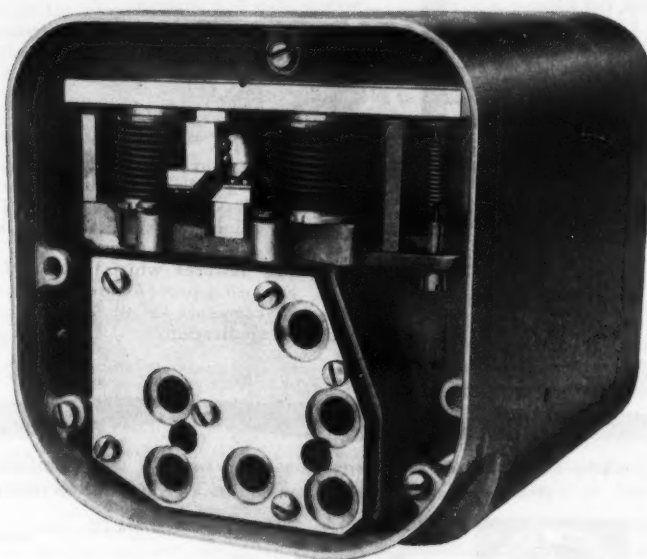
†Pioneered by Taylor in the TRI-ACT\* Controller

HERE is the perfect solution to your problems of overpeaking on start-up and large load changes—inherent weaknesses of proportional-plus-reset controllers. It is equally effective *at all times* whether variable is approaching control point from above or below—on start-up, or following major process disturbances or changes in set point.

The TRI-SCOPE Controller consists of a proportional-plus-PRE-ACT\*-response relay, called the TRI-SCOPE relay, and a proportional-plus-reset TRANSCOPE\* Controller. This combination provides controller characteristics similar to that of the TRI-ACT Controller, making possible the three major benefits listed above.

This unique new controller has been time-proven on one of the toughest possible reactor applications. For full information see your Taylor Field Engineer, or write for Bulletin No. 98332. Taylor Instrument Companies, Rochester, N. Y., or Toronto, Ont.

*For Vision . . . Ingenuity . . . Dependability  
in solving your process control problems.*



NEW 414RF TRI-SCOPE CONTROLLER

**MEAN ACCURACY FIRST**

Check 2840 opposite last page

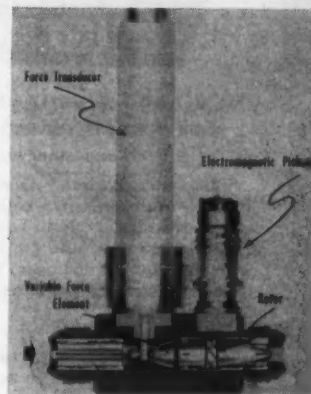
## INSTRUMENTS & LAB

**Simple mass flowmeter  
eliminates need for  
two instruments**

Accuracy of  $\pm 1\%$  is standard in versatile device

**Uses:** Measuring mass flow rate of a wide variety of liquids at flow ranges to one million pounds per hour.

**Features:** Simple mass flow meter combines in one instrument two metering components, eliminating need for



Simplified diagram of mass flowmeter

separate instruments, or sampling equipment required for specific gravities and volume rate flow measurements.

**Description:** Flowmeter is a small, compact device with an accuracy of  $\pm 1\%$  as standard. Flow through meter produces two outputs which are combined electronically to produce a mass rate of flow signal.

The variable force element produces a voltage proportional to volume flow rate and fluid density. Volumetric element, based on use of a rotor, produces a frequency proportional to volume flow rate. Combination of the two results in the necessary mass determination.

Read-out can be either digital or on a circular chart recorder. Sizes are from  $\frac{3}{4}$ " to 6". Rangeability is up to 10 to 1.

(Model 10G1515 mass flowmeter is product of Fischer & Porter Company, Hatboro, Pennsylvania.)

Check 2841 opposite last page.



# APPLETON Industrial Lighting

Higher Production • Fewer Rejects • Improved Employee Relations • Extended Safety Records

## "INTENSO"

### alzak\* aluminum floodlights FOR STORAGE YARDS, ATHLETIC FIELDS, and other large areas

The Intenso Alzak\* Aluminum floodlight provides high-intensity, trouble-free illumination year-round. Each light complete with 4-ft. cord. Available in 18" and 20" etched or polished reflectors, 20° to 90° beam spread. For 750-1000 or 1500 Watt PS-52 lamps and 400 Watt Mercury Vapor lamps.



#### Split Second Rear Relamping

No tools needed... No nuts or bolts! Rear lid with lamp opens wide for quick, easy access.

#### Rifle Like Aiming

After servicing, just flip lid down and clamp! Due to impregnated asbestos gasket seal, unit is now weatherproof. Exclusive louver ventilation eliminates condensation. Aim by looking through peep-sight, then lock in position... horizontal and vertical locking degree calibrations in each unit.

\* A proprietary term of  
Aluminum Company of America

## "EFU"

### explosion-proof fluorescent fixtures

FOR HAZARDOUS LOCATIONS IN GRAIN MILLS,  
REFINERIES, CHEMICAL PLANTS, COLOR PRINTING  
PLANTS, PHARMACEUTICAL CONCERNS, ETC.



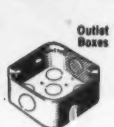
2, 3, and 4-lamp fixtures  
... Straight or angle  
mounting

Choice of "Pre-Heat," "Slimline," or "Rapid Start" ballasts. Designed for use with 40-Watt, 48", T-12, and 85, 90, or 100-Watt, 60", T-17 fluorescent lamps. End housings are cast aluminum with line connections made to a terminal block in the junction chamber.

Relamp from either end of the fixture... long lamp life, long ballast life without starters... quiet, flickerless operation... APPLETON factory seal eliminates external seals normally required within 18" of arcing devices... These are quality features which give APPLETON "EFU" Explosion-proof fixtures their continually growing acceptance in all types of hazardous industrial applications.

The correct light for every industrial application—including hazardous locations—backed by the technical excellence and experience of APPLETON'S vast production facilities assures you of lighting products designed to meet your needs. Write for complete information today... APPLETON—Standard for Better Lighting.

FLOODLIGHTS • REFLECTORS • DIFFUSERS • GROUP LIGHTS • HIGH MOUNTING FIXTURES  
STAKLIGHTS • WALK LIGHTS • YARD LIGHTS • SERVICE STATION LIGHTS



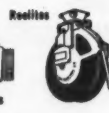
Outlet  
Boxes



Malleable Iron  
Union Fittings



"ST" Series Connectors

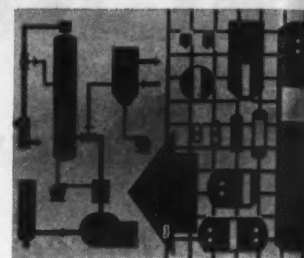


Reel Line

Sold Through Franchised Distributors Only

APPLETON ELECTRIC COMPANY • 1754 Wellington Avenue • Chicago 13, Illinois

## INSTRUMENTS & LAB



### Graphic symbols...

... to simplify assembly of graphic control centers and graphic panel boards use completely standardized system of basic symbols. Both metals and plastics are used. Attachment is positive. Sixteen colors are available.

(Graphic symbol system is product of Devco Engineering, Inc., PO Box 387, Caldwell, New Jersey.)

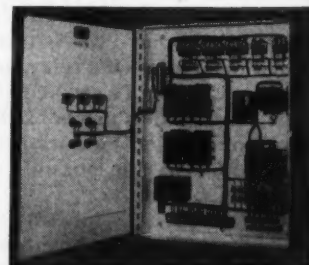
Check 2843 opposite last page.

### Controlled timing for centrifugals gives uniformity

Flexible program panel developed

Uses: As control panel for flexible programming of basket centrifugals.

Features: Control system makes it possible to duplicate



Basket centrifugal control panel  
housed in water-tight cabinet

precisely and automatically each phase of the centrifugal's operation.

Description: Developed for Tolhurst centrifugals, control panels have been engineered to give maximum flexibility, adaptability, safety to meet widely varied requirements. Control cycle circuit consists

Check 2842 opposite last page

of two parallel circuits simultaneously initiated at end of unloading operation. One circuit controls speed of machine while other circuit controls operation performed on machine.

Circuit design allows all operations to be performed at either maximum or minimum speed or allows some operations to be performed at medium speed with others at maximum speed.

Control panels are available in dust and moisture proof cabinets or explosion-proof enclosures.

(Centrifugal control panels are manufactured by Eagle Signal Corporation, Moline, Illinois.)

Check 2844 opposite last page.

#### Over-range protector has repeat action

Reopens after sealing at 2% below cut-off point

**Uses:** Provides over-range protection for sensitive pressure-actuated instruments as manometers, draft gages.

**Features:** Over-range pressure guard has repeatable action. Adjustment and resetting can be made at any time.

**Description:** Designed for either atmospheric or relative pressure systems, over-range pressure guard covers span of -15 psig to 85 psig. Body material is aluminum. Diaphragm is Buna-S impregnated with nylon. Guard reopens after sealing at 2% below cut-off point. Maximum allowable pressure after cut-off is 300 psi.

(Gage Gard Jr. is product of Industrial Engineering Corp., 525 E. Woodbine, Louisville, Kentucky.)

Check 2845 opposite last page.

**Miniature switches,** both basic switches and related devices, are described in 32-page basic switch catalog. Over 200 switches and devices are described in Cat 62c — Micro Switch Div., Minneapolis-Honeywell Regulator Co., Freeport, Ill.

Check 2846 opposite last page.

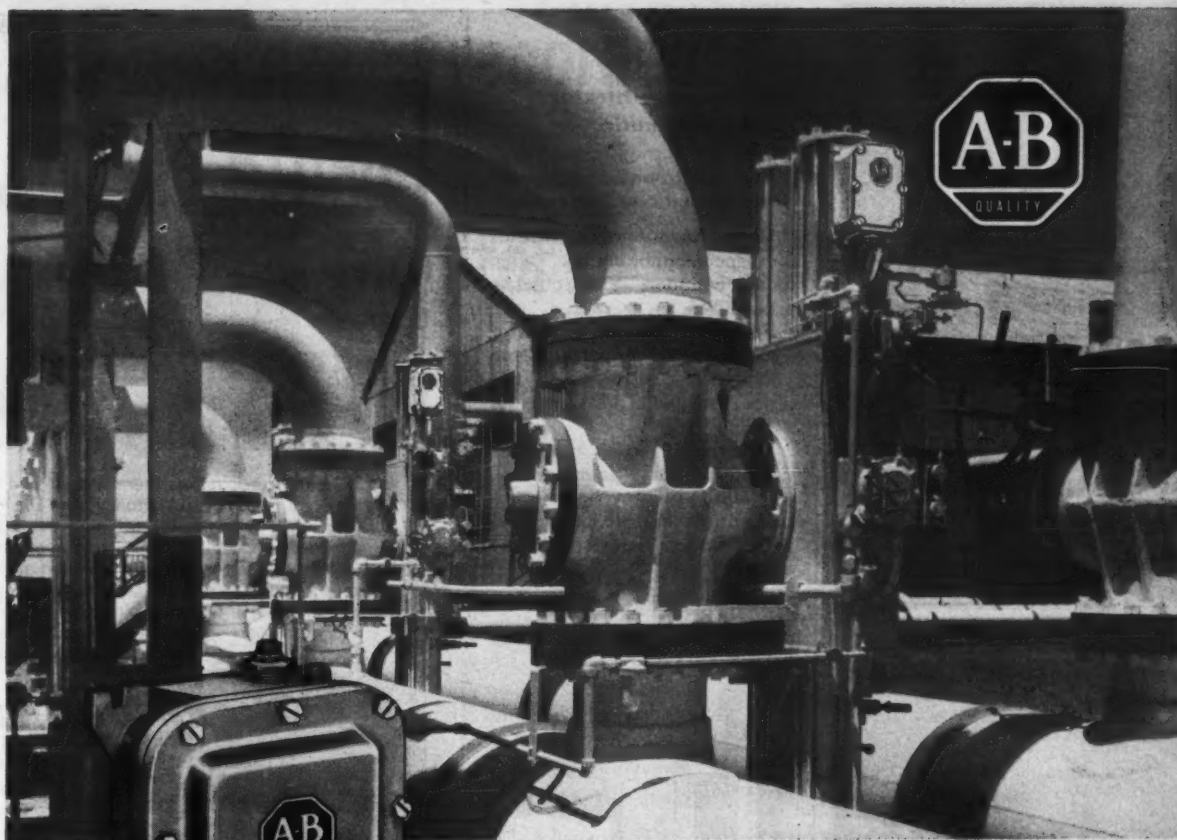
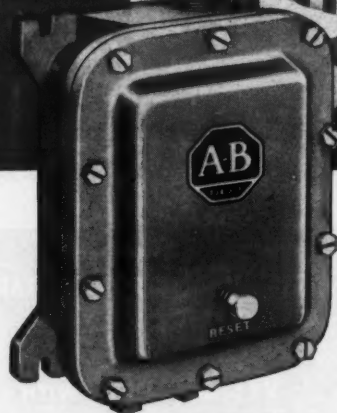


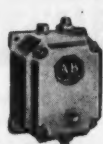
Photo Courtesy of El Paso Natural Gas Co.



Bulletin 709 Size 1 Solenoid Starter in NEMA Type 7 enclosure for hazardous gas locations.



NEMA 4  
Watertight  
Weatherproof



NEMA 9  
For Hazardous  
Dust Locations



NEMA 8  
For Corrosive  
Hazardous Gas



NEMA 11  
Corrosion-  
proof

Allen-Bradley Bulletin 709 across-the-line solenoid starters are made in nine sizes with maximum ratings up to 450 hp, 220 volts; 900 hp, 440-550 volts.

Allen-Bradley Co.

104 W. Greenfield Avenue, Milwaukee 4, Wisconsin  
In Canada: Allen-Bradley Canada Ltd., Galt, Ont.

## Complete "Safety" —At Lowest "Over-All" Cost!

It takes time—which is money—to inspect control in bolted NEMA Type 7 or NEMA Type 9 enclosures. Therefore, though the initial cost may be the same, it will reduce "maintenance" costs to select the control which does not require "regular" inspection. Such control is made by Allen-Bradley.

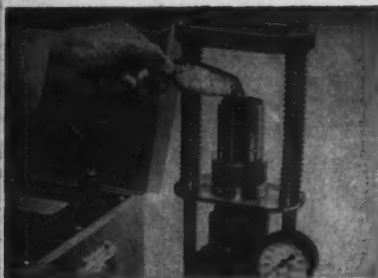
The simple contact mechanism for which A-B starters are famous has only ONE moving part. This is your assurance of millions of trouble free operations. There are no bearings to corrode and stick . . . no flexible jumpers to break. And the double break, silver alloy contacts *never* need servicing — they remain in perfect operating condition until completely worn away. In addition, all A-B starters have permanently accurate thermal overload relays that protect motors against burnouts — whatever the atmospheric conditions.

Specify Allen-Bradley *quality* motor control for *all* your installations . . . you'll save on maintenance *and* enjoy maximum safety.

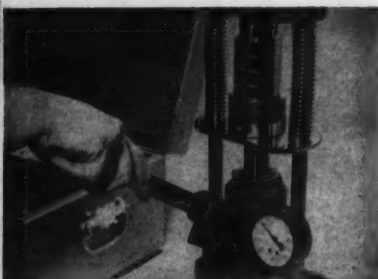
**ALLEN-BRADLEY**  
MOTOR CONTROL  
QUALITY

Check 2847 opposite last page





**FEED IT...**



**SQUEEZE IT...**



**READ IT...**

### G-5 Moisture Register for accurate moisture tests in 60 seconds

Fastest moisture test available with accuracy to 0%. Save production and lab time—no skilled labor needed. Use Electronic Moisture Register G-5 anywhere on granular, ground, loose, shredded and powdered materials. Hydraulic pressure assures homogeneous sample. Specially calibrated for ammonium nitrate, ammonium sulphate, toilet soaps, calcium carbonate, sulphur, ammonium perchlorate, sodium bicarbonate, polyethylene resins, many more. Accuracy guaranteed. Ask for free trial.

Write, stating material to be tested, and moisture range, or check No. 2848 on reader service slip.

**ELECTRONIC  
MOISTURE REGISTER**  
Instruments

Moisture Register Co., Dept. CPC  
P.O. Box 910, Alhambra, Calif.

Check 2848 opposite last page

## INSTRUMENTS & LAB

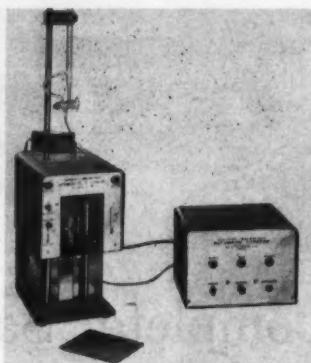
### Multi-purpose titrator is also automatic

For spectrophotometric and electrometric procedures

**Uses:** As automatic titrator for spectrophotometric and most common electrometric procedures.

**Features:** Automatic titrator can be easily converted from one type of titration to another by means of a selector switch.

**Description:** Consisting of three separate components, automatic titrator has a control unit, a solenoid buret valve, and a titration assem-



Automatic titrator with cover removed from titration compartment

bly. Titration compartment is provided with an elevating base plate and a centering system for positioning the titration beaker. Above the compartment is an electrode mounting plate to mount electrodes for potentiometric titration or coulometric generation. At left of titration compartment is light source and a filter dial with six interference filters as at right. Control unit includes end-point sensing and switching electronic circuits. Front panel controls permit manual operation of buret and stirring motor.

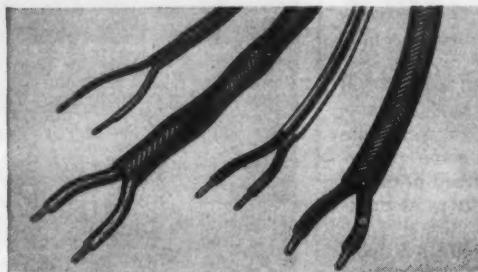
Maximum transmission wave length of filters furnished are 500, 525, 550, 575, 600 and 650 millimicrons.

(S-29700 spectro electro titrator is product of E. H. Sargent & Co., 4647 W. Foster Ave., Chicago 30, Ill.)

Check 2849 opposite last page.

## Thermocouple Wires

Quality • Variety • Delivery



Thermo Electric makes thermocouple and thermocouple extension wires for every possible use—actually over 1500 varieties. Just a few seconds with a T-E Wire Catalog will find the exact type you need. Solid and stranded conductors are available in all standard calibrations. The most modern types of insulations will meet all conditions of moisture, chemical action, abrasion and high temperature. Our own complete facilities for wire drawing, insulating and calibrating guarantee you unmatched quality. Prompt delivery on most types from our large stock.

Write for New Wire Catalog No. 32-R

**Thermo Electric Co., Inc.**

SADDLE BROOK, NEW JERSEY  
In Canada—THERMO ELECTRIC (Canada) Ltd., Brampton, Ont.

Check 2850 opposite last page

ACCURATE TEMPERATURE READINGS

WHEREVER AND

WHENEVER WITH

Veri-tell

PORTABLE

PYROMETERS BY WEST

These rugged, handy precision-built instruments are widely used for taking spot readings where permanent installations are needless and for checking other instruments. Each mounts a Veri-Tell high resistance pyrometer in a gasketed aluminum housing, itself contained in practical Oak Case with lock and handle. Quick, positive service is assured by binding posts for attaching thermocouple. Automatic meter shunt protects meter when case is closed. Fully guaranteed and surprisingly low priced. Write for Catalog IE-1.

British Plant: WEST INSTRUMENT, LTD.  
52 Regent St., Brighton 1, Sussex  
Represented in Canada by UPTON, BRADEEN & JAMES

Many standard and special thermocouple assemblies including hand probes are available to permit reading—

- Surface temperature of dies, etc.
- Temperature of non-ferrous molten metal
- Immersion temperature of hot oil, wax, solder pots, etc.

ASK YOUR DEALER

**WEST**  
CORPORATION

CHICAGO  
SALES OFFICES IN PRINCIPAL CITIES

4357C W. Montrose • Chicago 41, Ill.

Check 2851 opposite last page

CHEMICAL PROCESSING



THAT'S  
INTERESTING

#### Insulation board

A Japanese process for lightweight insulation board has diatomaceous earth, asbestos fiber, lime, and caustic boiled together, dried, crushed, and then kneaded with sodium silicate and a small amount of lime.

The sheeted roll is cured in steam under pressure, resulting in a board of high bending strength, good heat conductivity, and low density. (Silicate P's & Q's, Philadelphia Quartz Company)

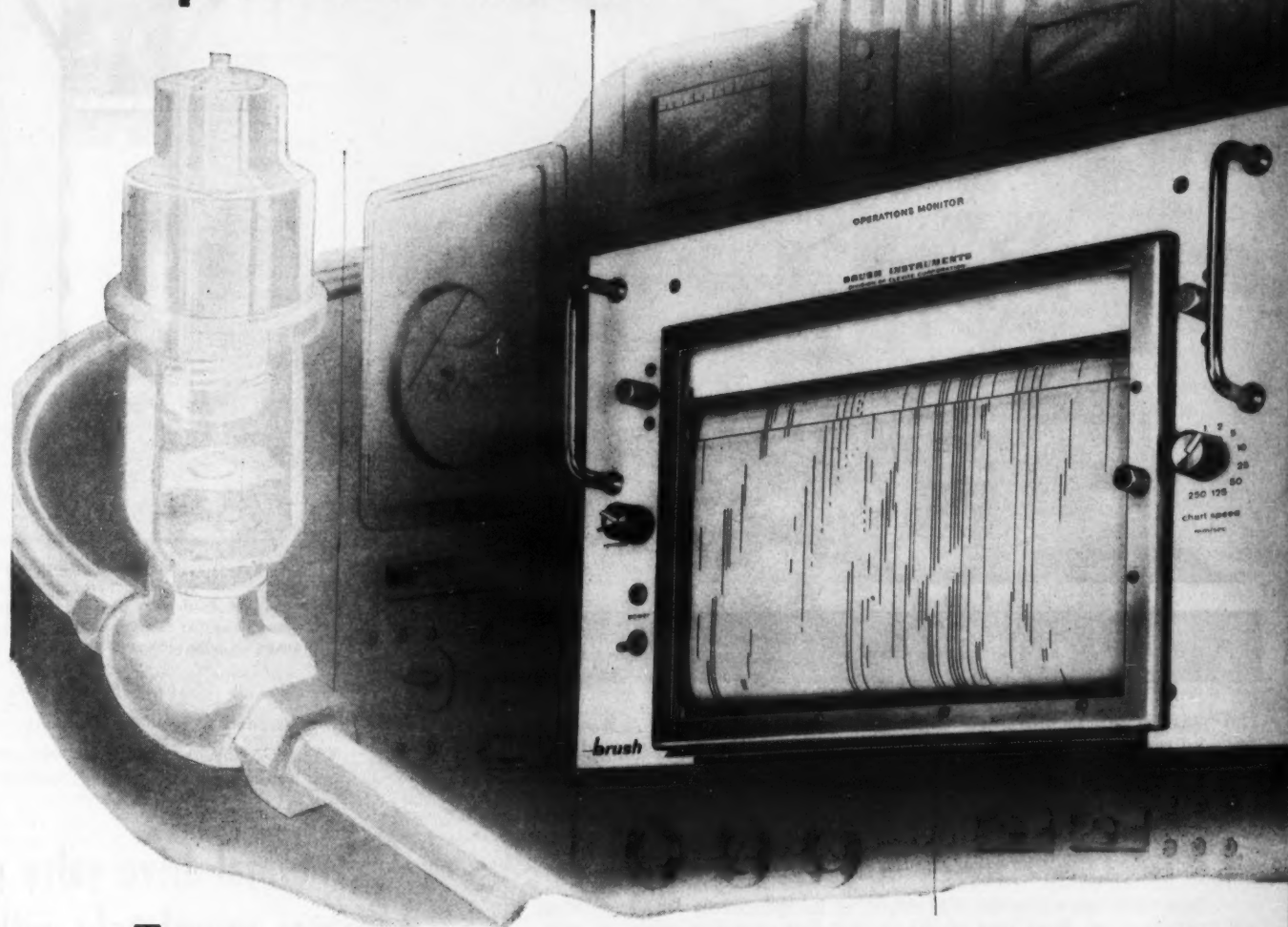
#### Radioisotope light source

Radioisotope-excited light sources for industrial signal systems and markers operate independent of external power sources. They consist of specially selected, radiation-responsive phosphor crystals, enclosed in hermetically sealed transparent capsule and excited to luminescence by  $Kr^{85}$  gas.

For more information on product at right, specify 2852 see information request blank opposite last page.



## 100 processes recorded on One Brush Operations Monitor!



This compact Brush Operations Monitor can improve the control of power distribution systems, chemical processes and automated production lines.

On a moving chart only 12" wide, 100 separate operations can be recorded at the same time . . . what happens or doesn't happen . . . monitoring present recording and indicating devices. For example, the opening or closing of a valve . . . the

action of a relay . . . the control of motors . . . all are documented in a time relationship to other operations. You get an immediate picture of an *entire situation* at any time. Sixteen different time bases can be selected from remote or on-the-spot locations.

Write to Brush for details. Engineering assistance is available at all Brush factory branches, strategically located throughout the United States.

**brush** INSTRUMENTS

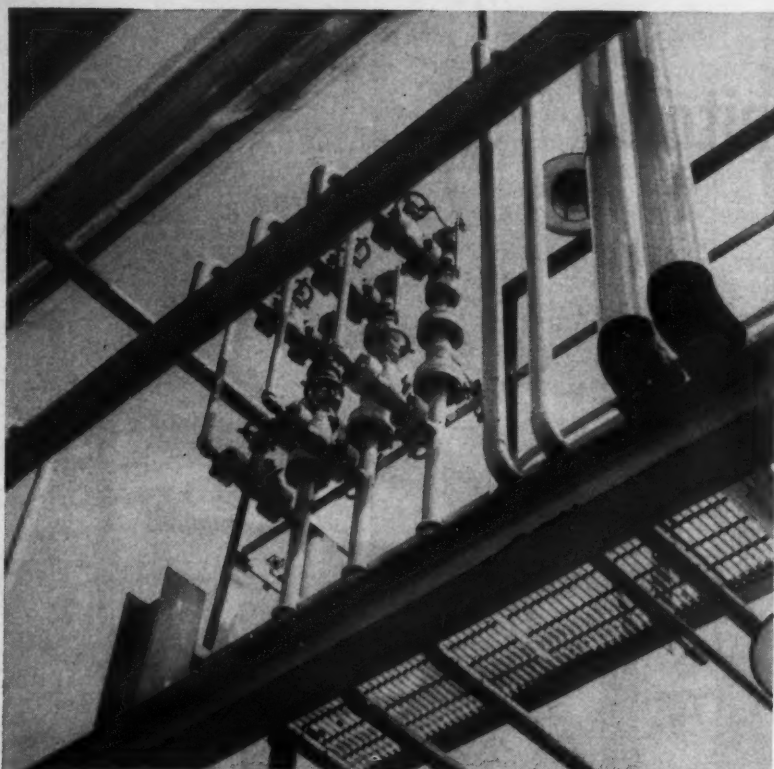
3405 PERKINS AVENUE

DIVISION OF  
**CLEVITE**  
CORPORATION

CLEVELAND 14, OHIO



## FORGED STEEL VALVES FOR CHEMICAL & PETROCHEMICAL PLANTS



ORBIT VALVES shown in above picture are installed on Header of Hydrogen Dehydrator.

Orbit forged steel valves were chosen for the above service because of their non-lubricated positive closure seating principle. Costly maintenance and the possibility of fluid contamination carry-over from valve lubricants which lower catalyst efficiency, has been eliminated. Lubricant is not required for any part of the valve's mechanism that comes in contact with fluid being handled in cavity of valve.

Please specify service intended when ordering Orbit valves. For other special applications, our industrial division will be glad to help you with your particular service problem.

Orbit valves have a long history of performance in: Hydrocarbons, Nitrogen, Hydrogen and Naptha Fractions. Watch these ads for additional facts about Orbit valves and recommended services.

**SIZES:** 1", 1½", 2", 2½", 3" and 4" ASA 300-lb thru 2500-lb, full opening flanged and screwed ends. Venturi opening available in sizes: 2", 2½", 3", 4" and 6" ASA 150-lb thru 2500-lb flanged ends only.

**SOURCE:** Through your favorite industrial supply house.

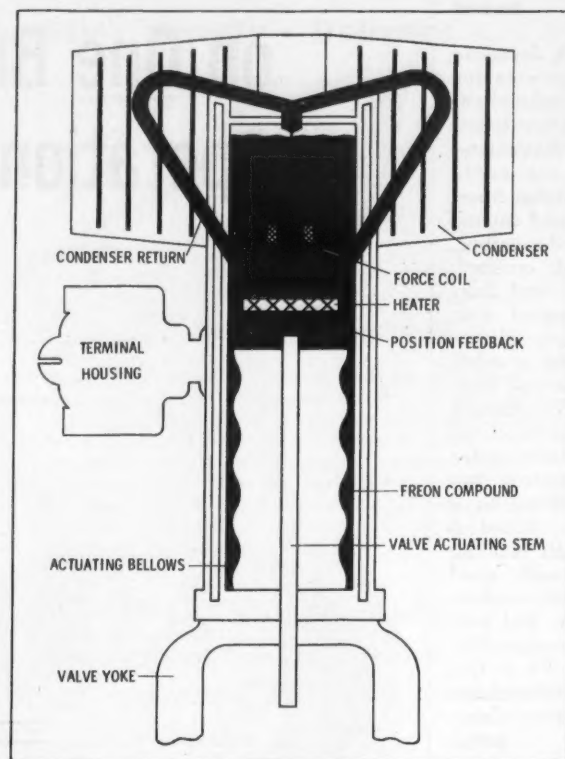
**LITERATURE:** Write Department B for Catalog 58-B.

## ORBIT VALVE COMPANY

P. O. BOX 699, TULSA, OKLAHOMA, Phone LUther 4-4761, TWX TU 925  
WAREHOUSES: HOUSTON, TEXAS, 407 Velasco, Capitol 8-6623, TWX HO 115; ODESSA, TEXAS, 402 West County Road, Federal 7-2263, TWX ODESSA TEX 8706; LAFAYETTE, LOUISIANA, 3111 Cameron St., Center 4-3326; CASPER, WYOMING, 414 South Elm Street, Phone 2-1324; EDMONTON, ALBERTA, CANADA, 7119-104th St., Phone 391-283.  
WEST COAST REPRESENTATIVES: Charles Lowe Company, 383 Fourth Street, San Francisco, Calif.; Marshall E. Niedecker Company, 2785 Cherry Ave., Signal Hill, Calif. CANADIAN REPRESENTATIVES: T. R. Pickford & Company, Ltd., Calgary, Alberta, 309 7th Avenue West; Amherst 2-7371. EXPORT REPRESENTATIVE: New York 36, N. Y., 500 Fifth Avenue, Bryant 9-2236.

Check 2853 opposite last page

## PROCESS INSTRUMENTATION and LABORATORY APPARATUS



Here's the inner workings of heat engine that completes the "loop" of electronic control systems. "Force" coil moves in-and-out of permanent magnet field according to control signal. Movement opens or closes valve (at top) permitting gas to escape. Changing pressure on bellows thus opens or closes valve in line

Designed to provide simplicity, reliability,  
and economy in a valve operator, and — close  
the loop in an electronic control system

## Thermal-drive valve actuator operates completely without motors

**Uses:** As automatic control valve actuator which completely eliminates any need for pneumatic or electro-hydraulic operators, and ties in with an electronic control system. Although use is limited to applications requiring less than 300 lbs useful thrust and 1.5 inch stroke, many installations in the chemical processing industries will fall within this area.

**Features:** Thermal-drive actuator operates completely without motors, yet is said to be a powerful motivating device. Critical positioning of valve or other control element is possible, yet operation of actuator is claimed to be non-critical with respect to power input, ambient temperature, or other environmental factors.

**Description:** Operating on basis of controlled release of



Thermal-operated valve actuator has condenser on top

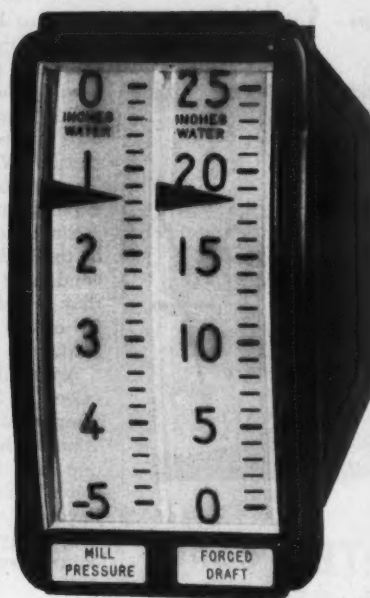
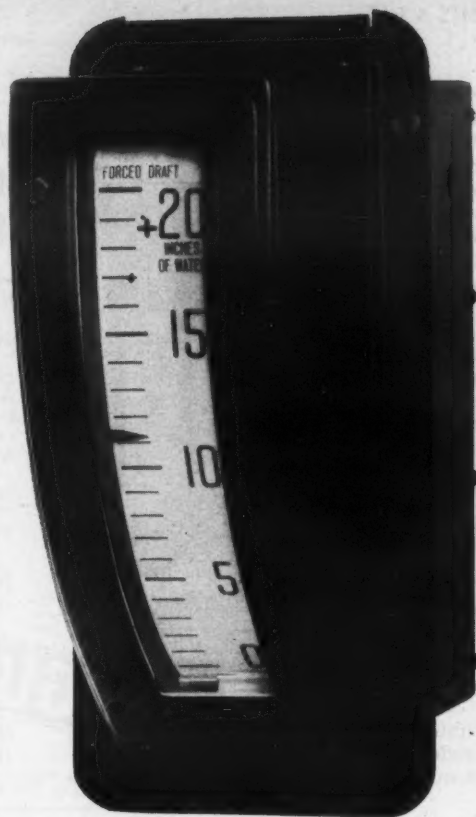
heat, thermal-drive actuator requires no gear trains, no pumps, no magnetic amplifiers, no transistors, no relays . . . no electrical contacts of any kind.

Control of actuator is governed by positioning of force coil within body of unit, similar to operation of a voice coil in a loud speaker. Control signal is applied to force coil in magnetic field of a permanent magnet. Resulting mechanical motion of coil is then translated into opening or closure of a heat release valve.

#### Freon Gas Develops Pressure

All internal parts of actuator are submerged in Freon, a liquid fluorinated hydrocarbon, which is subjected to a constant, but non-critical, heat input. The heat causes a constant vaporization of liquid, tending to increase pressure within system.

Force coil, operating in con-



## NEW BAILEY Multi-Pointer Gage

...has twice as many indicators  
...no taller than a telephone!

Now the popular versatile Bailey Multi-Pointer Gage has been reduced in size to conserve control panel space—without loss of easy readability.

Each new Multi-Pointer Gage Unit offers you these three choices to—

1. Measure and indicate draft, pressure, differential pressure and level.
2. Transmit above variables either pneumatically or electrically to remote indicators, recorders and/or controllers.
3. Receive and indicate any measured variables which may be transmitted pneumatically by standard SAMA ranges of 3-15 psig. or 3-27 psig.

#### FEATURES

**Compact Size**—Two large, easily-read 7" scales in space only 4 inches wide.

**Wide Range Selection**—Standard ranges from 0-0.5 in. H<sub>2</sub>O to 0-5000 psig available.

**Choice of Standard Colors**—Satin Black, Slate Gray, Moss Green, or Terra Tan may be selected as an exterior color at no additional cost.

**Colored Scales**—Scales available in white, red, green, blue, yellow, or orange.

**Fluorescent Illumination**—All gages have slideout unit containing bulb and starter for ease of maintenance.

**Readily Accessible Adjustments**—Zero adjustment made from front of gage. Other adjustments made from rear of gage.

**Two-point Positive Mounting**—Gage unit mounted with control clips . . . no holes to drill or studs to weld.

**Unlimited Indications**—Any number of basic two-indicator units may be placed side-by-side to provide indication of related factors. Each two-indicator unit is separately mounted.

For additional information, call your local Bailey District Office, or write us direct.

Chemical and petroleum division

## BAILEY METER COMPANY

1074 IVANHOE ROAD • CLEVELAND 10, OHIO

In Canada—Bailey Meter Company Limited, Montreal



CPS-1

Check 2854 opposite last page



# DEPENDABLE 100% AUTOMATIC REMOTE READING Tank Contents Gauges

- RELIABLE
- NO POWER REQUIRED
- UNDERWRITERS' APPROVED

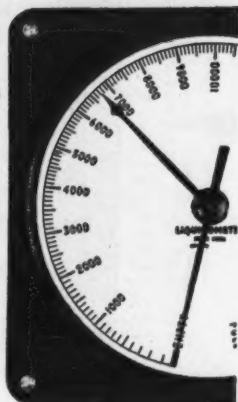
Liquidometers use a temperature compensated balanced hydraulic system. Indications unaffected by changes in specific gravity. All models feature large easy-to-read dials. UL approved switches available.

Write for complete details to Dept. D.

Since 1920  of proven quality

**THE LIQUIDOMETER CORP.**  
LONG ISLAND CITY 1, NEW YORK

Check 2855 opposite last page



## INSTRUMENTS & LAB

junction with a mechanical feedback arrangement, constantly strives to achieve a balanced pressure within system by regulating release of vapor into a cooling condenser, and thus back into system.

When rate of heat release is reduced, pressure builds up within the actuator, causing bellows to contract. Valve is thus closed with down-stroke motion. When rate of heat release is increased, the bellows expands, causing an upstroke.

Since heat input is constant, in the order of 300 watts, and condenser capacity is more than ample, maximum power in either direction is easily achieved.

Ambient temperatures between  $-50^{\circ}$  and  $140^{\circ}\text{F}$ , line temperatures, radiant heat, or weather have no effect on the operator. Despite these conditions, unit establishes a heat balance within itself which accurately reflects signal from control system.

**All Components  
Below Rated Capacity**

All moving parts and electrical components are hermetically sealed, submerged in the non-corrosive dielectric fluid. All components are designed so as to operate well below rated capacities. The heater, for example, is loaded to less than 25% of capacity. The Freon liquid fill is non-explosive, non-flammable, and non-toxic.

Speed of response is 0.1 inch per second, requiring 15 seconds for full closure. Load sensitivity is such that less than 1.5% displacement produces a full rated thrust. Signal input range is 1.0 to 5.0 milliamperes DC.

(Thermo-Drive Actuator is product of the Swartwout Company, 18511 Euclid Ave., Cleveland 12, Ohio.)

Check 2857 opposite last page.

For more information on developments reported in this section, check corresponding numbers on Reader Service Slip opposite last page of this issue.

## The Liquid Level Is Always Visible In The NON-FROSTING JERGUSON GAGE



Special patented design prevents frost from forming over the vision slot.

If you are gaging low temperature fluids . . . and have difficulty with frost . . . you need Jerguson Non-Frosting Gages.

With the Jerguson Non-Frosting Gage the liquid level reading is always visible. A special frost preventing unit, attached to the gage glass, projects beyond the cover bolts so the frost cannot build up across the vision slot in the cover forging.

Don't guess any longer. Use Jerguson Non-Frosting Gages and be sure of your liquid level readings on low temperature work.

Available in any length, in both reflex and transparent types. Write for Data Unit on Non-Frosting Gages.

Gages and Valves  
for the Observation  
of Liquids and Levels

**JERGUSON**

JERGUSON GAGE & VALVE COMPANY  
100 Adams Street, Burlington, Mass.

Offices in Major Cities. In Canada: Peacock Bros. Ltd.  
In England: Jerguson Tress Gage & Valve Co. In France: Pétrole Service

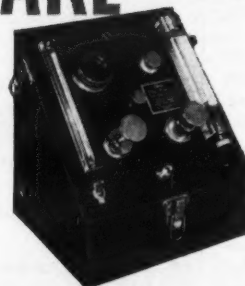
Check 2858 opposite last page

# TAKE

# GUESSWORK

# OUT

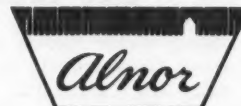
of  
DEW POINT  
READING  
with



**Alnor** DEWPOINTER

Any shop man can quickly...accurately...read dew points with the Dewpointer. It is the only instrument that lets you see the fog in a sealed chamber under controlled conditions. Compare this fast, positive method with attempts made to tell exactly when fog forms on a mirrored surface. Completely self-contained, requires no external coolant or auxiliary apparatus...operates on enclosed battery or AC. Available in three ranges for dew points between  $-20^{\circ}\text{F}$ . and room temperature, from  $-80^{\circ}$  to  $0^{\circ}\text{F}$ . and  $-80^{\circ}\text{F}$ . to room temperature.

Send for Dewpointer bulletin. Tear out this ad and send on your letterhead to: Illinois Testing Laboratories, Inc., Room 504, 420 N. LaSalle St., Chicago 10, Ill.



PRECISION INSTRUMENTS  
FOR EVERY INDUSTRY

Check 2859 opposite last page

CHEMICAL PROCESSING

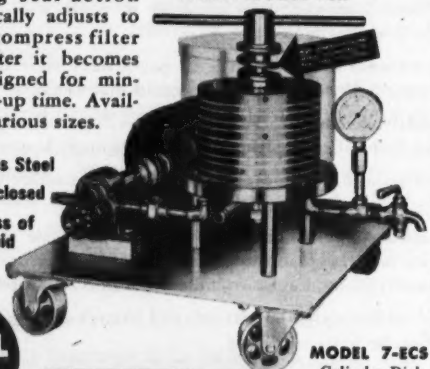
## LOOK Now Constant Seal of Filter Media...

with New Ertel Cylinder Disk Filters

• Spring seal action automatically adjusts to further compress filter media after it becomes wet. Designed for minimum set-up time. Available in various sizes.

PATENT APPLIED FOR

- ▲ Stainless Steel
- ▲ Totally Enclosed
- ▲ No Loss of Liquid



MODEL 7-ECS  
Cylinder Disk



Send for Bulletin 19-S  
**ERTEL  
ENGINEERING CORP.**

Liquid Handling Equipment Since 1932

KINGSTON 3

NEW YORK

Branch Office & Showroom, New York, N.Y.

Check 2856 opposite last page

## THAT'S INTERESTING

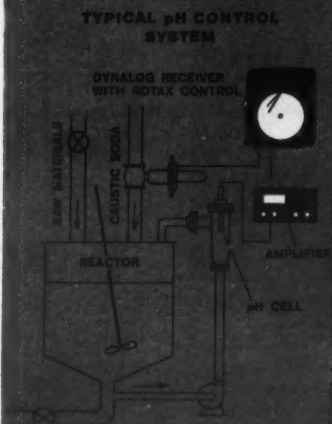
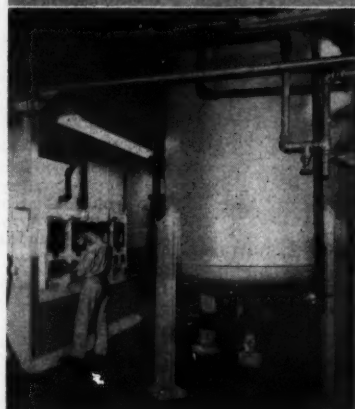
### Raceway concrete moss loss

A large power station in Australia was troubled by such excessive growths of moss in the raceways that the water supply was considerably restricted. Elemental sulfur or copper compounds incorporated with sodium silicate in the surface of the raceway concrete reduced the growth to insignificant proportions. (Silicate P's & Q's, Philadelphia Quartz Co.)

### Chemists beware!

You may be replaced by automated chemistry lab. New British instrument system, the Analmatic, will free scientists from routine analytical work, according to U.S. distributor. Price is \$15,000 to \$50,000 annually. And claimed annual salary saving is \$45,000. (Industrial Research Newsletter, Armour Research Foundation)

For more information on product at right, specify 2860 see information request blank opposite last page.



at Sika Chemical—

**REACTORS CONTROLLED WITHIN 0.1 pH**

by Foxboro **DYNALOG\*** Recorder-Controllers

At Sika Chemical Corp., Passaic, N. J., control of pH in reactors is of vital concern in manufacturing "Plastimet," Sika's widely-used concrete densifying additive.

Sika finds Foxboro Dynalog Recorder-Controllers perfect for the job. Dynalog's smooth variable air capacitor (which replaces troublesome step-by-step slide-wires) responds instantly to the smallest change in pH value. A Rotax on-off control unit then initiates addition of enough caustic soda to return reactor pH to set point.

Sika reports maintenance on their Dynalogs has been almost nil. One tube

\*Reg. U.S. Pat. Off.

replaced in three years. No lubrication...no cleaning...no dry cells to standardize or replace. "In fact," says process engineer Gordon Morrison, "we're so confident of Dynalog's performance that our reactors run right through the night—unattended."

Dynalog Electronic Recorders—Controllers—Indicators deliver accurate, sensitive, measurement not only of pH, but of dozens of other variables as well. Get full details by writing for Bulletin 20-10. The Foxboro Company, 8112 Neponset Ave., Foxboro, Mass.

# FOXBORO

REG. U.S. PAT. OFF.

**DYNALOG ELECTRONIC INSTRUMENTS**



## "Difficult" Pressure Protection Problems?



Solve Them With...  
**BS&B Safety Heads!**

BS&B's D and DV Rupture Discs, which are fully interchangeable in BS&B Safety Head flanges with conventional type pre-bulged discs, are engineered to give highly desirable Safety Head protection to those pressured systems in which one or more of the following "difficult" conditions prevail:

1. When operating pressure must be close to relief pressure.
2. When high operating temperatures are involved.
3. When alternating pressure and vacuum prohibits the use of standard one-layer rupture discs.
4. When pulsating pressure conditions prevail.
5. When a combination of metal and plastic disc construction is needed to obtain lower rupture pressures.

BS&B D and DV Rupture Discs have these advantages:

1. Fast action and unrestricted relief openings.
2. Wider rangeability in selection of metals and plastics for disc components.
3. Longer service life.
4. Rugged construction for added protection against possible damage by rough handling.



Let BS&B Safety Heads solve your pressure protection problems. Our engineers will gladly evaluate your pressure system to assist you in proper selection of Safety Heads.

**BLACK, SIVALLS & BRYSON, INC.**

Safety Head Division, Dept. 2-M12  
7500 East 12th Street  
Kansas City 26, Missouri  
Telephone: BEnton 1-7200

Check 2861 opposite last page

## INSTRUMENTS & LAB



Hook gage . . .

. . . for low air pressure and vacuum measurements of 0" to 24" is said to have permanent plus or minus 0.001" accuracy. Can act as standard to check or calibrate other instruments used to measure air pressures in fan or blower work.

(No. 1425 hook gage is product of F. D. Dwyer Mfg. Co., PO Box 373, Michigan City, Indiana.)

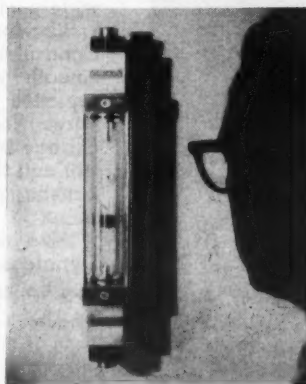
Check 2862 opposite last page.

### Area-type flow meter lines out quickly

Flow value can be read without averaging

Uses: As general purpose industrial flow meter for liquids and gases.

Features: Variable area flow meter lines out quickly without bobbing to permit exact

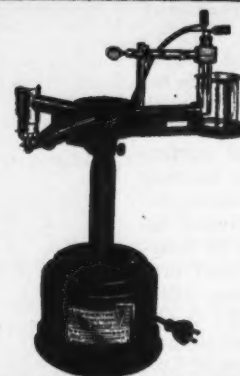


Flow value can be read directly on flow meter without averaging.

*Sensitive*  
*Versatile*  
Moderately Priced

## FISHER SPECTRANAL

FOR QUALITATIVE AND SEMI-QUANTITATIVE ANALYSIS OF SOLIDS AND SOLUTIONS



### HOW THE NEW, IMPROVED FISHER-TODD SPECTRANAL WORKS FOR YOU

The Fisher-Todd Spectranal permits you to make spectroscopic, qualitative analyses faster, more specifically and more conveniently than any chemical method yet developed for metallic elements. Macro or micro samples of alloys, pharmaceuticals, ores, foods, inorganic and metallo-organic chemicals, etc., whether in solutions or solids, can be analyzed with this versatile, moderately-priced instrument. Semi-quantitative, too.

### 2 METHODS OF ANALYSIS



**WANT TO KNOW MORE ABOUT THE FISHER-TODD SPECTRANAL?**  
Write for Bulletin FS-258. It describes the materials which can be analyzed and methods of analysis.

B-399

163 FISHER BLDG., PITTSBURGH 16, PA.



**FISHER SCIENTIFIC**

IN THE U.S.A. Cleveland St. Louis IN CANADA  
Boston Detroit Washington Edmonton  
Buffalo New York  
Charleston, W.Va. Philadelphia IN MEXICO Montreal  
Chicago Pittsburgh Mexico City Toronto

America's Largest Manufacturer-Distributor of Laboratory Appliances & Reagent Chemicals

Check 2863 opposite last page

CHEMICAL PROCESSING



reading of flow value without visual averaging.

**Description:** As flow rate increases or decreases through meter, a highly finished float rises or falls in a precision-bore glass tube proportionately exposing more or less of a V-shaped orifice. Because of orifice shape, flow height is directly proportional to flow into the side of the flow tube.

Capacity of standard meters ranges from 0.001 gpm to 30 gpm of water; 0.002 to 90 scfm of air. For other capacities. Flow value is indicated on a graduated scale etched ties and fluids, interchangeable floats are supplied.

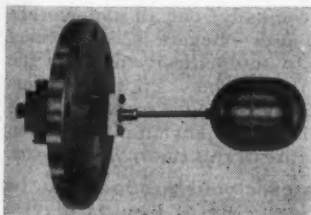
Working pressure will vary with meter size. Rating for 1/4 inch meter is 250 psi and 70°F. Maximum operating temperature is 250°F. Stainless steel jackets can be furnished for higher pressures.

(Series 5000 Tapor-Flo meter is product of C-Mar Corp., 35 Euclid Ave., Manasquan, N.J.)

Check 2864 opposite last page.

#### **Snap-action control achieved with float switch**

Special valve assembly on float switch permits it to have positive snap-action control. Unit is air operated. Controller is available with either a mechanical coupling or with a



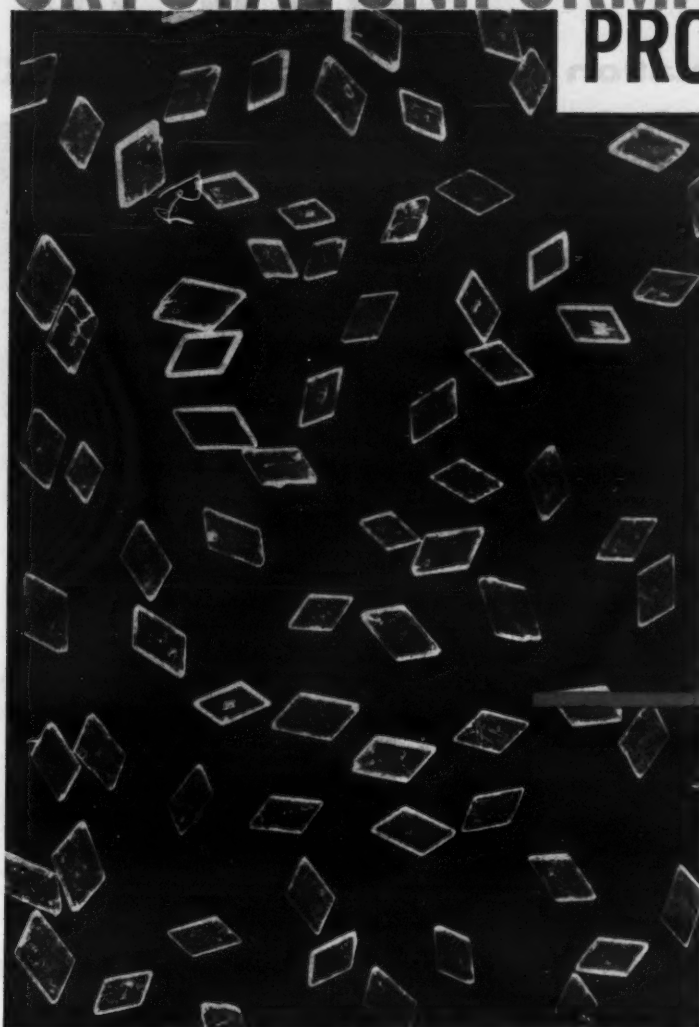
Float switch is mounted through side entrance to tank

conventional flanged connection. Horizontal mounting through a side entrance on tank allows liquid to raise the float and thus operate the snap-acting valve.

(SnapOmatic float switch is product of Instruments, Inc., PO Box 556, Tulsa, Okla.)

Check 2865 opposite last page.

# CRYSTAL UNIFORMITY PRODUCT PURITY



STANDARD WITH



## KRYSTAL<sup>®</sup> CRYSTALLIZERS

*a type for  
every crystallizing  
service*

The features you want . . . controlled crystal size and uniformity, product purity and economical operation are standard features of all Struthers Wells Krystal Crystallizers. And, there is a type and size suited to every crystallization operation.

These include evaporator crystallizers both open and closed types, vacuum type and cooling type for continuous operation, and

batch crystallizers for intermittent operation. All feature Struthers Wells' unique crystallization process which holds solutions under controlled supersaturation conditions that assure controlled crystal size and purity.

For further information, WRITE for Bulletin CE-57 or inquire about our pilot plant research services on crystallization problems.



## STRUTHERS WELLS CORPORATION

WARREN, PA.

Representatives in Principal Cities

Plants at Warren, Pa. and Titusville, Pa.

#### CHEMICAL PROCESSING DIVISION

Crystallizers . . . Direct Fired Heaters . . .  
Evaporators . . . Heat Exchangers . . . Mix-  
ing and Blending Units . . . Quick Opening  
Doors . . . Special Carbon and Alloy Process-  
ing Vessels . . . Synthesis Converters

#### BOILER DIVISION

BOILERS for Power and  
Heat . . . High and Low  
Pressure . . . Water  
Tube . . . Fire Tube . . .  
Package Units

#### FORGE DIVISION

Crankshafts . . . Pres-  
sure Vessels . . . Hy-  
draulic Cylinders . . .  
Shafting . . . Straight-  
ening & Back-up Rolls

Check 2866 opposite last page

THE MARK OF QUALITY



Wheelco  
Instruments

## Precision Instrumentation Aids Petroleum Industry Product Research



Here's a completely instrumented unit that plays an important part in major oil company research aimed at developing new products and improving existing ones. Known as a "Sarnia Fractionator," it is a development of H. S. Martin Company, Evanston, Illinois.

Upper recorder, with a 12 mv range, records and controls vacuum from atmospheric to .01 mm pressure while the lower recorder is a multipoint unit that reads and records various zone temperatures in the fractionating equipment. The two controllers at the upper left of panel control temperature of charge and product stream of the equipment.

Ranges, control forms, and accuracies of all instrumentation in this installation are ideally matched to equipment needs to provide outstanding performance at realistic cost. The same qualities of process instrumentation experience and clear-headed practicality can be applied to your next job — just get in touch with your nearby Wheelco field engineer for details.

### BARBER-COLMAN COMPANY

Dept. L, 1520 Rock Street, Rockford, Illinois, U.S.A.

BARBER-COLMAN of CANADA, Ltd., Dept. K, Toronto

Check 2867 opposite last page

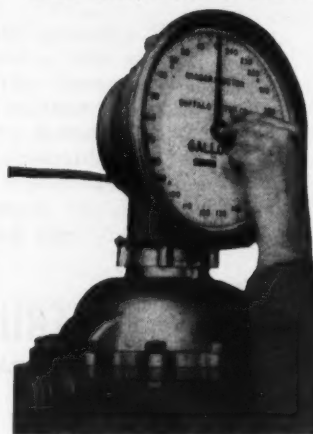
# HOW TO INSURE Uniform Product Quality



Glucose being measured accurately from storage tank to cooking vats in large candy making plant.

## Niagara Meters do it Automatically

Set for 175 Gallons



Get 175 Gallons

Consistent high quality in every batch of candy can only be maintained by accurate formulation. That is why this candy company, one of the world's largest, uses Niagara Electriccontact Meters to automatically measure the liquid ingredients... positive assurance of day by day accuracy that has maintained the enviable reputation and quality of this candy for 15 years.

Whatever your product may be — if measuring of liquids plays a part in its production, you can be sure of consistent quality by the use of Niagara Electriccontact Meters. Automatic measurement is a must in today's competitive market. Avail yourself of this cost-saving, time-saving accuracy by automation. Write for complete information.

## BUFFALO METER CO.

2892 MAIN STREET • BUFFALO 14, NEW YORK

Check 2868 opposite last page

CHEMICAL PROCESSING



**CORROSION  
CONTROL**

Allowing corrosion coupons to be inserted  
and retrieved from natural gas gathering lines —

# ACCESS FITTINGS provide safe entry against pressure

**GORDON WEYERMULLER**, Petrochemical Editor  
with **E. J. GALLAGHER**, General Manager  
Pincher Creek Gas Processing and Sulphur Plant  
The British American Oil Co., Ltd.  
Calgary, Alberta, Canada

Fittings, which permit coupons to be inserted or removed from lines under pressure, have proved to be successful and useful in corrosion control program at the Pincher Creek Gas Processing and Sulphur Plant in Canada. In this plant sulfur is recovered from natural gas with an amine absorption system. Since the natural gas contains about 10-11 molecular percent  $H_2S$ , corrosion is a potentially severe problem.

Access nipple consists of a union assembly, with a tapered seat and fine threads machined within it to accommodate a screw-in plug. This plug seals off pressure from tapped pipe line to which the nipple is welded. Plug is made of 303-304 stainless steel. This plug can be readily replaced by special plugs for inserting corrosion coupons, hydrogen probes, thermocouples, samplers, or other devices.

To gain entry through an access nipple, a retriever is required. This retriever con-

sists of an outer cylinder and inner rod having a common head. They ride respectively upon and within an inner cylinder. Packing cells within cylinder are arranged so that when pressure is admitted into inner cylinder, it is balanced. This permits outer cylinder and probe to be advanced, the probe going into outlet.

At Pincher Creek about 30 access fittings have been used to advantage for more than a year on natural gas gathering lines. Of these 30, 16 access fittings are used on sour gas lines at about 1500 psi. On condensate lines 11 more are used at 450 psi. No leakage has occurred through any of these fittings.

Three other standard access fittings are in service on a sweet gas line at pressures up to 5200 psi. Since it was not intended that the standard access fitting be used at such a high pressure, some leakage of gas through them has occurred. They were installed for use when line is used in sour

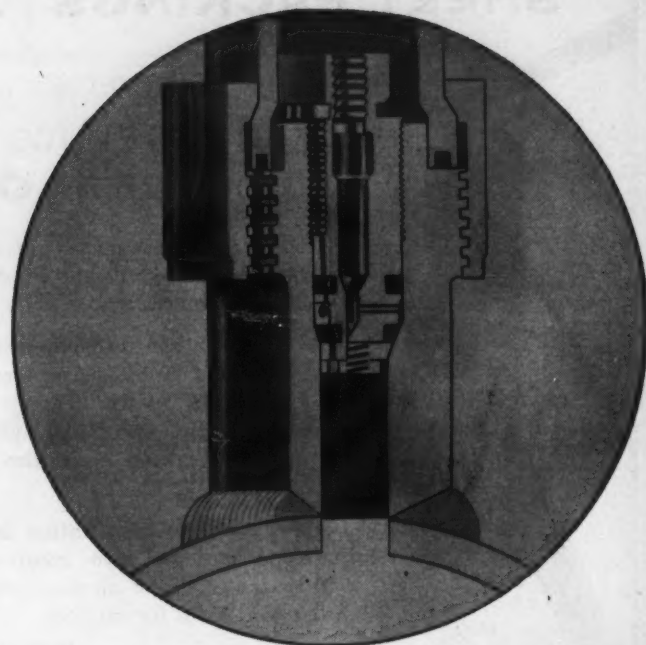
gas service at lower pressures. Special access fittings can be obtained which will withstand a pressure of 5200 psi or higher without leakage.

A retriever has been successfully used in removing coupons for examination. Due to the highly corrosive nature of the sour gas, it was found necessary to change types of metal used for standard retriever to avoid hydrogen sulfide stress cracking.

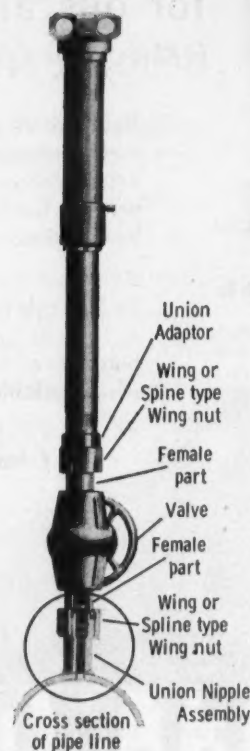
Access fittings have enabled plant to insert and retrieve coupons under full line pressure. Hydrogen probes have been successfully used with fittings for a few months. Since a Corrosometer is in use in the plant, it is expected that the probes for it will be inserted and removed from line under pressure in the future.

(Access fittings and retriever are products of Cosasco Div., Perfect Circle Corporation, 11655 McBean Drive, El Monte, California.)

Check 2869 opposite last page.



▲  
Cutaway of access fitting with union assembly showing plug turned down against tapered seat, sealing off pressure from tapped pipe line to which access fitting is welded



▲  
Removal and replacement of corrosion coupons is accomplished under pressure with retriever



## TWO SUPERIOR SHEET PACKINGS . . . .

### for all chemicals Belmont **TEFLON\***

Inert to all chemicals (excepting molten alkali metals and fluorine at elevated temperatures).

Available in sheet thicknesses from  $\frac{1}{16}$ " up, and in sheet sizes from 24" by 24" to 48" by 48". Tape is available in continuous rolls in thicknesses from .005 up and in widths up to 12 inches.

Cut gaskets to specification and envelope gaskets with compressible filler materials for all standard pipe flanges. Write for catalog.

\*In Part Trademark

### for oils and solvents Belmont **NEOPRENE**

#### ask your BELMONT Distributor

Such leading Packing  
Distributors as:

Mit & Industrial Supplies, Inc.  
in Louisville

and

Starling Rubber Products Co.  
in Dayton

are ready to serve you promptly  
and helpfully, wherever you are.

Belmont Neoprene sheet packing has high resistance to petroleum products, alcohol, caustics and many acids. It has high tensile strength and has good abrasion resistance.

Available in standard rolls, 40" wide by 10 yards long, in thicknesses from  $\frac{1}{16}$ " to  $\frac{1}{4}$ " inc. and in durometer hardness of 40, 50, 60, 70, 80 and 90. Also available in cut gaskets.

Write for Catalog 56.  
The Belmont Packing & Rubber Co.  
Butler & Sepviva Sts.,  
Phila. 37, Pa.

# BELMONT

Check 2870 opposite last page

## CORROSION CONTROL

*Plastic tank trailer  
handles wide variety  
of corrosives*

Lightness in weight permits  
extra payload

Tank trailer made from polyester resin reinforced with glass fiber has outstanding resistance to oxidizing acids and other oxidizing media. Resistance to solvent attack is broad. Resistance to alkalis is



Reinforced plastic tank trailer  
in chemical service

moderate, although ample to meet many of the requirements of chemical service. Acid resistance, in general, is excellent.

One of the advantages of the plastic tank trailer is an extra payload obtained because of the light-weight of the plastic. From 1000 to 3500 lb of additional material can be carried on each trip.

Tensile strength as high as 100,000 psi can be obtained in a reinforced plastic trailer. This factor, plus a tendency of the plastic to yield and bend, makes rupture unlikely. Reinforced plastic tanks can also be easily cleaned.

(Series P trailer tank is product of Haveg Industries, Inc., 900 Greenbank Road, Wilmington 8, Delaware.)

Check 2871 opposite last page.

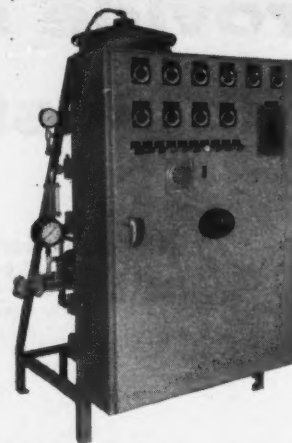
**"Compression" design  
of heat exchanger  
boosts efficiency**

Uses: Unit is designed to provide heat transfer under corrosive conditions.

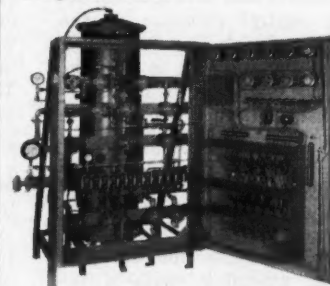
Features: By keeping all graphite components in compression, there is greater strength in graphite parts of the exchanger. This provides increased resistance to internal and external mechani-

## ionXchange

### AUTOMATIC *"Package Unit"* MIXED-BED DE-IONIZER



For all types of processes requiring very pure water. Completely automatic. All functions easily adjustable. Completely assembled, ready for hook-up. Made in a range of practical sizes. Write for particulars on these new, valuable, and highly adaptable units.



ILLINOIS WATER TREATMENT CO.  
840 CEDAR ST., ROCKFORD, ILL.  
NEW YORK OFFICE: 141 E. 44th St., New York 17, N.Y.  
CANADIAN DIST.: Pumps & Softeners, Ltd., London, Can.

## ILLCO-WAY

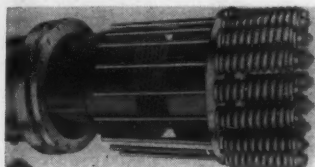
Check 2872 opposite last page  
CHEMICAL PROCESSING

## CORROSION CONTROL

cal shock, including steam hammer. Also, the exchanger has the ability to accept operating pressures to 200 psi.

A more positive packing around the floating end is obtained, while at the same time permitting the heat transfer cylinder to move in the shell with greater uniformity. This results in lessened maintenance, and therefore, more economical performance.

**Description:** In this impervious graphite heat exchanger, the entire heat transfer cylinder and dome are held in con-



Impervious graphite heat exchanger provides 20% higher over-all heat transfer coefficient and accommodates over two times greater operating pressures

stant compression by means of spring loading on floating end of unit. In use, corrosives come in contact only with impervious graphite. This material is unaffected by action of all corrosives except a few highly oxidizing agents.

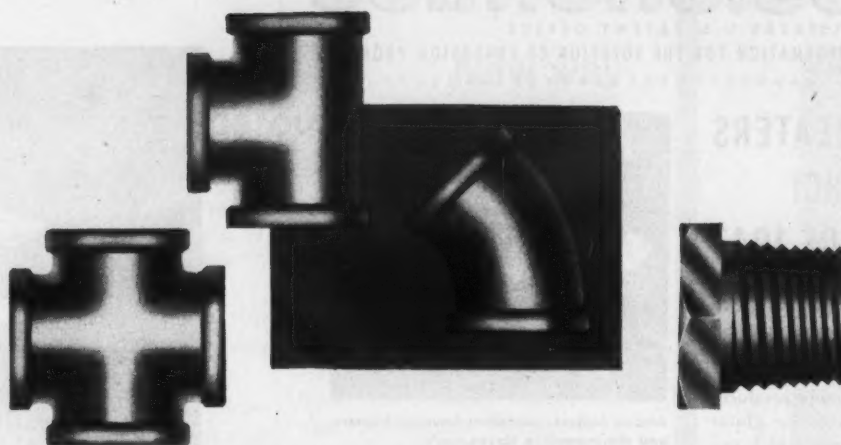
It is immune to effects of thermal shock, is non-contaminating, and possesses a rate of thermal conductivity approximately five times that of conventional material. Cross-bore impervious graphite heat exchangers are furnished in 14 standard models in capacities from 24.7 to 470 square feet of transfer surface.

(Cross-Bore impervious graphite heat exchangers are product of Falls Industries Inc., Aurora Road, Solon, Ohio.)

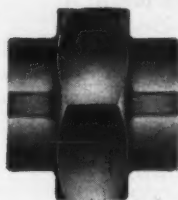
Check 2873 opposite last page.

**Pump bulletin** of 14 pages features nine-page chemical-resistance chart that is based on combination of static immersion tests, field reports, and laboratory tests. Technical data and general information on self-priming pumps for handling corrosive material are included. Form JTD-105 — Jabsco Pump Company, 2031 N. Lincoln St., Burbank, Calif.

Check 2874 opposite last page.



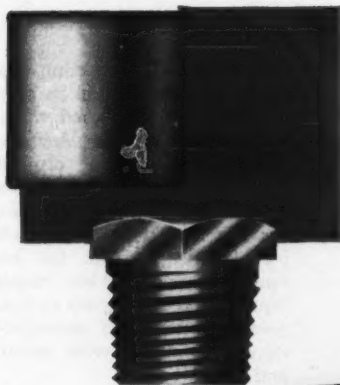
# YOU CAN BEAT CORROSION



## ESCO CAST STAINLESS FITTINGS SOLVE CORROSION PROBLEMS

Conveniently warehoused in ESCO Alloys 45 (Type 316), 40 (Type 304), 20 (ACI CN-7M) and Hastelloy B and C. ESCO 150 lb. PSI fittings and flanges are stocked in the standard range of types and sizes in screwed, flanged and welding styles. Special cast fittings are available, or can be made to engineering specifications in any size and in all analyses. Alloy designation is "in-the-metal" on all fittings.

See your nearest ESCO dealer—he can help you solve your corrosion problems. Ask for ESCO Catalog No. 175.



### ELECTRIC STEEL FOUNDRY COMPANY

2186 N. W. 25TH AVE. • PORTLAND 10, OREGON  
MFG. PLANTS AT PORTLAND, ORE. AND DANVILLE, ILL.  
Offices in Most Principal Cities  
ESCO INTERNATIONAL, NEW YORK, N. Y.  
IN CANADA ESCO LIMITED

Check 2875 opposite last page

# Fansteel Corrosionomics

REGISTERED U. S. PATENT OFFICE

A JOURNAL OF USEFUL INFORMATION FOR THE SOLUTION OF CORROSION PROBLEMS

## TANTALUM HEATERS IN HOT HCl SERVICE SINCE 1947

In continuous service since 1947, two Fansteel tantalum bayonet heaters have solved a major corrosion problem for the A. E. Staley Mfg. Co. at Decatur, Ill. The company produces large amounts of monosodium glutamate, an amino acid salt which enhances the flavor of food. The first step in processing is the hydrolysis of several amino acids in corn gluten with hot HCl.

### Heats at 1,800,000 Btu per Hour

At the outset, approximately 15,000 lbs. of 18° to 20° Be HCl plus 100 gallons of water must be heated in one hour to 150° F. The two Fansteel tantalum bayonet heaters accomplish this in a Haveg tank, under 60 psig steam. Each measures 72" long, by 1½" in diameter. In addition, acid heating cycles are regulated by a temperature controller using a thermocouple in a tantalum thermowell.

The heat transferred ranges from 1,200,000 to 1,800,000 Btu per hour, depending upon the entering temperature of the acid from outdoor storage tanks at ambient temperature. Since the bayonet heaters have an area of



Arrows indicate tantalum bayonet heaters and thermowell in Haveg tank.

about five square feet, the heat transfer coefficient attained is about 1,400 Btu per hour per degree F per square foot.

### No Corrosion—Even with Continuous Exposure

As can be appreciated, corrosion is a major problem in this process—and tantalum is one of the few materials of construction that has resisted corrosive attack successfully. Three tantalum heaters were installed as original equipment, but the process now operates on two with ample heating capacity. The A. E. Staley installation, along with a host of others, have proved tantalum's complete immunity to HCl at all concentrations and temperatures up to and including constant boiling temperatures. Among these are numerous instances where tantalum equipment has been subjected to hot HCl for 15 years and more with no perceptible attack.

### Free Tantalum Test Kit

A corrosion test kit, available without charge to research technicians, if requested on your letterhead; contains both tantalum sheet and wire.

### Free Technical Information

The above condensation is typical of the articles which appear in CORROSIONOMICS, a Fansteel publication. Mail us your name for inclusion on our free mailing list.



G585A

For further data on the above, write:

**FANSTEEL METALLURGICAL CORPORATION**  
CHEMICAL EQUIPMENT DIVISION

NORTH CHICAGO, ILLINOIS, U. S. A.

Check 2876 opposite last page

## CORROSION CONTROL



Reynolds personnel inspect Monel netting used to secure insulation on tanks

## Monel insulation netting withstands assault from hot caustic and salt air

- Has lasted four years at Reynolds Metals without deterioration

**Problem:** Metal netting used for holding insulation in place on storage tanks failed within six months at the Reynolds Metals Company alumina plant at Corpus Christi, Texas.

Location of plant on Gulf Coast made the netting subject to attack from the hot, humid salt air. Also, caustic liquor used in process at temperatures to 390°F sometimes came in contact with netting and corroded it.

**Solution:** Plant started using Monel nickel-copper alloy insulation netting on outdoor digester, washer and settling tanks. After the netting is placed over insulation, a tar-asphalt compound is applied to provide further protection to the insulation.

Monel netting used is 1" hex mesh, 3-twist netting fabricated from 0.028" Monel wire. It is supplied in 4 x 300' rolls. Monel was selected for netting over other alloys since its



Plant employee bolts down Monel screen used in filter subjected to caustic solution in alumina process

CHEMICAL PROCESSING



ductility makes it less expensive to draw into fine wire.

**Results:** Monel netting has not been affected by corrosive atmospheric conditions or chemicals during the four years it has been in service. More of netting is being used in additional facilities being built at present.

Plant also uses a fine-mesh Monel filter leaf in the Vallex filter used to separate the red mud from the alumina dissolved in the caustic liquor. Monel has also given good service in this application.

(For further information on Monel contact The International Nickel Company, Inc., 67 Wall Street, New York 5, New York.)

Check 2877 opposite last page.

(Monel insulation netting was fabricated by Gilbert & Bennett Mfg. Co., Georgetown, Connecticut.)

Check 2878 opposite last page.

#### **Flexible Teflon hose now available to 3" diam.**

**Uses:** For handling chemicals, acids, and other active or caking solutions.

**Features:** Formerly, due to unusual surface characteristics of Teflon and manufacturing problems, 1 1/4" hose was the limit. Now, Teflon hose is available up to 3" in diameter.

**Description:** Flexible Teflon-lined hose is able to withstand temperatures up to 325°F, depending on size and construction. Hose can be made with manufacturer's special type flange which avoids use of metal couplings.

(Flexlon hose is product of Manhattan Rubber Division, Raybestos-Manhattan, Inc., Passaic, N. J.)

Check 2879 opposite last page.

For more information on developments reported in this section, check corresponding numbers on Reader Service Slip opposite last page of this issue.

## **New way to pump "dangerous" liquids safely**

**Goulds vertical process pump Fig. 3181 for handling highly volatile, inflammable, toxic, explosive or other dangerous liquids.**

Here's a pump that *can't leak* dangerous liquids... and lets you pump at extreme temperatures.

It's Goulds Fig. 3181 tripod-mounted vertical centrifugal process pump—a new pump specially designed to handle two of your toughest jobs:

1. Lets you handle highly volatile, inflammable, toxic, explosive or other dangerous liquids *safely*. Pumpage is completely isolated from the atmosphere.

2. Lets you pump liquids at extremely low or high temperatures (minus 320° to plus 550° F.). The

fluid end of the pump is well insulated from the bearings, mechanical seals, and driver and is free to expand or contract without binding or distortion.

A closed adapter and column allows the introduction of a pressurized inert gas or clear compatible liquid which isolates bearing and upper stuffing box. Proper control of gas or liquid prevents contact with outside elements.

Available in stainless steel or other corrosion-resistant metals. Capacities to 800 GPM and heads up to 300 feet.

Find out how you can pump liquids with complete safety and at extreme temperatures by contacting your nearest Goulds Pumps representative, or write for Bulletin No. 727.2.



## **For highly corrosive liquids GOULDS-PFAUDLER glassed pumps**

Glass permanently fused to metal at all parts that contact pumpage gives you extra protection against corrosion.

Use Fig. 3182 where liquid to be handled is highly corrosive or where non-adherence or no metallic contamination is required.

Temperatures up to 350° F. on all acids except hydrofluoric. Capacities to 700 GPM, heads to 140 ft.

Ask for Bulletin 727.3.



**GOULDS PUMPS, INC.**

Dept. CP-128, Seneca Falls, N. Y.

**GOULDS**

**PUMPS FOR THE  
PROCESS INDUSTRIES**

Check 2880 opposite last page

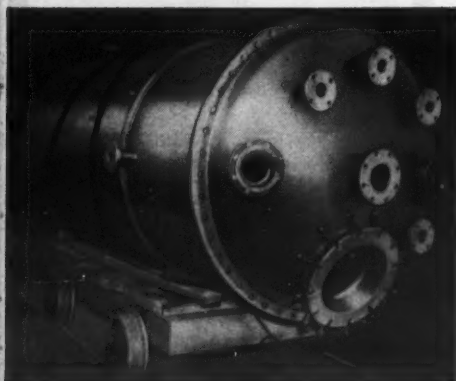
# Where lead gives useful corrosion control in liquid Sulphur Dioxide process vessels and piping

Hot  $\text{SO}_2$  vapors and other oxidation products present in liquid  $\text{SO}_2$  processing are "murder on metal." Even that old corrosive marauder,  $\text{H}_2\text{SO}_4$  gets into the act.

As a result, *lead* practically lives with these acids and gases throughout the  $\text{SO}_2$  process. In fact, the flow chart at the right is almost a continuous flow of *lead* applications. For ducts. For piping. For sheet lead linings in the larger units like the scrubbers and strippers. It is used with steel, with wood, with copper and, in some cases, with concrete. The result is low maintenance cost, facility of repair and consequent freedom from costly production stoppages.

If your process involves corrosive chemicals, look to *lead* for long life, low maintenance and minimum loss of production due to down-time.

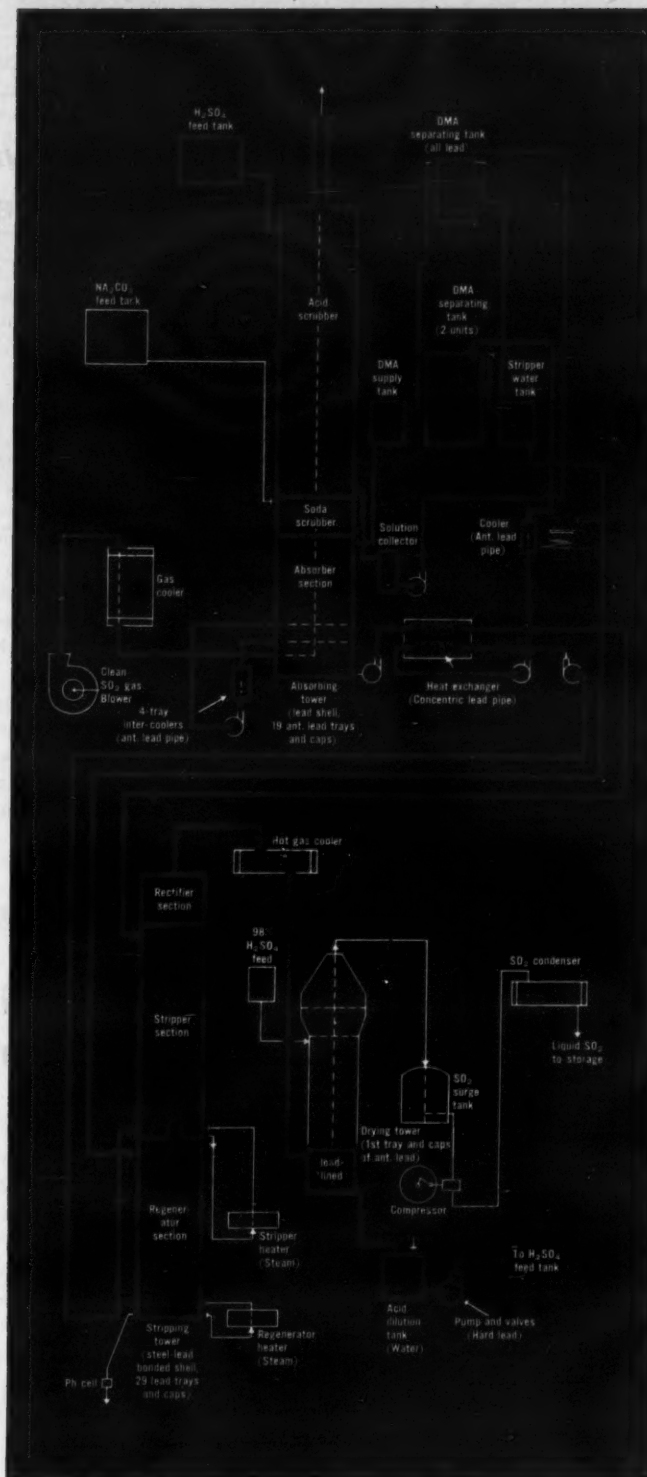
## When you think of Lead ...think of National Lead



National Lead has the experience to get *lead* and steel together in a *bond* that defies severe pressure and temperature changes, vibration and creep. That's been proved not only in regular production "stock" items such as piping and valves but also in specially designed, complex lead

process and storage equipment. If you are enlarging or modernizing your processing facilities, now's a good time to get the facts about lead-lined equipment. Contact National Lead Company, Lead Lined Products, 111 Broadway, New York 6, New York.

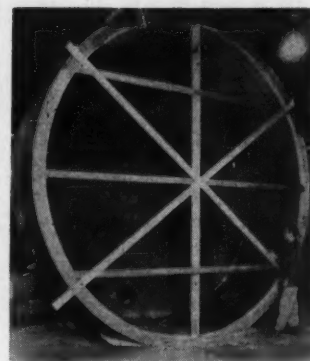
Check 2881 opposite last page



## CORROSION CONTROL

**More than 14,000 gal  
of hydrochloric acid  
held in plastic tank**

One of the largest acid storage tanks ever fabricated from reinforced plastic was recently placed in service at a large petroleum refinery. The tank



Plastic storage tank prior to installation

will hold more than 14,000 gal of hydrochloric acid. Tank is made from polyester resin plastic and is reinforced with a combination of woven glass cloth and glass mat.

Duracor reinforced plastic was selected for this application because of its corrosion resistance, lightweight, and strength. Tank has a 14' height and is 14' in diameter. Use of the translucent plastic eliminates the need for an external glass tank gauge.

(Duracor storage tank is product of The Ceilcote Company, Inc., 4832 Ridge Road, Cleveland 9, Ohio.)

Check 2882 opposite last page.

**Excellent flow provided  
by highly flexible  
Teflon Hose**

Minimum bend radius is 3 1/3 times equivalent tube size

**Uses:** Product is designed for high-temperature and corrosion-resistant applications.

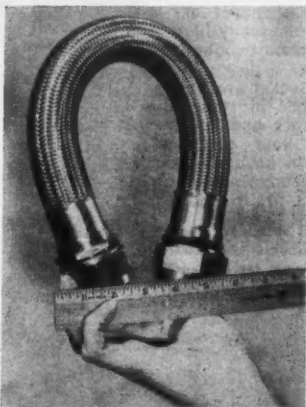
**Features:** Because of low convolutions found in inner tube, hose has excellent flow characteristics. Minimum bend radius is 3 1/3 times equivalent tube size. Resistance to

## CORROSION CONTROL

corrosion, along with inert properties of Teflon liner, insures extremely long hose life, manufacturer reports.

**Description:** In manufacture of inner tube of hose, Teflon is helically wound on a mandrel, overlaid by Teflon-coated Fiberglas tape, and then put through a die which convolutes and compresses the two materials together. Next, this structure is sintered into a homogeneous unit of great strength and flexibility. Stainless steel wire is then braided over the hose by a special process.

Hose is available in diameters from  $\frac{3}{4}$  to 2". It has a temperature range of at least



Corrosion-resistant hose has minimum bend radius of  $\frac{3}{2}$  times equivalent tube size

—65° to 400°F. Braid, as well as all fittings, is corrosion-resistant. Compression-type end fittings are factory-swaged on-to hose to provide permanent, leak-proof connection. Fitting assures positive grip on wire braid while maintaining fluid-tight flexible seal on innercore.

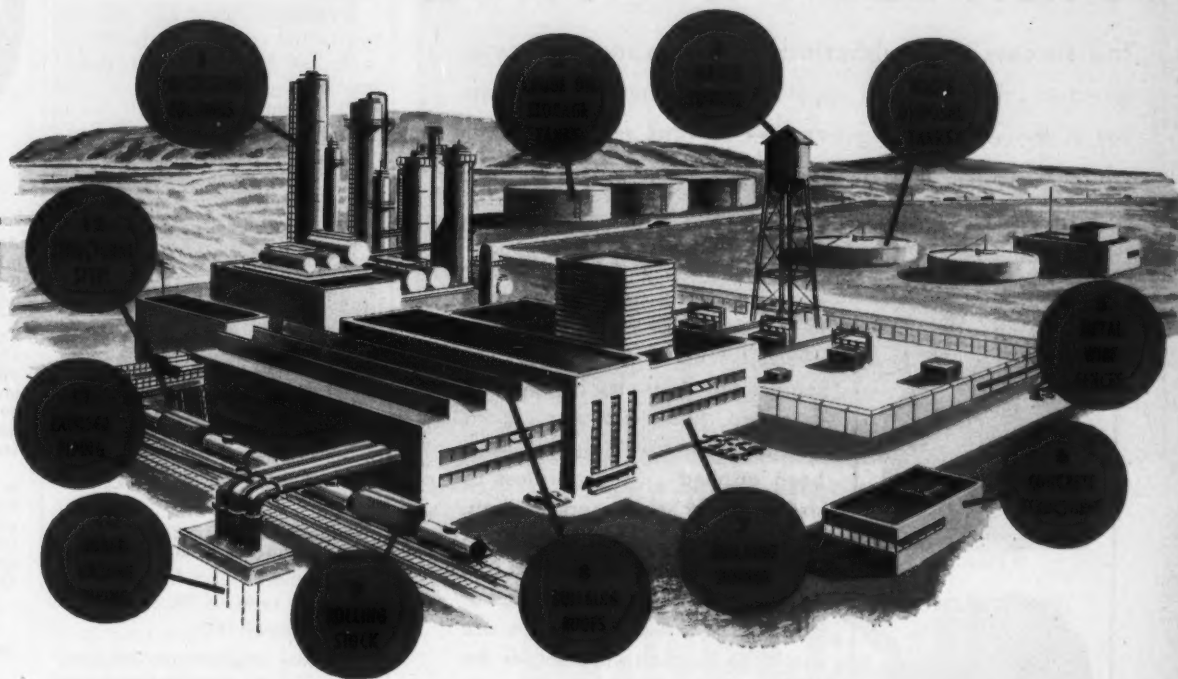
(Springfield "400" Teflon hose is product of Titeflex, Inc., Hendee St., Springfield 4, Massachusetts.)

Check 2883 opposite last page.

Pipe fittings and valves made of hard rubber are detailed in eight-page bulletin. Physical properties of natural and Buna-N rubber are included. Chemical resistance of both types is given. Bul PF 1300 — Luzerne Rubber Company, Trenton, N. J.

Check 2884 opposite last page.

# Solve Your Plant's Toughest Corrosion Problems with these PITT CHEM Coatings



1. **Processing Columns**—For corrosion control alone, use *Insul-Mastic 4010* gilsonite-asphalt vaporseal. For insulation and corrosion protection, use *Insul-Mastic 553* Type D with incorporated cork granules.
2. **Crude Oil Storage Tanks**—For bottom and top of interiors, use patented PITT CHEM *Tarset* coal tar-epoxy resin coating. For exterior use *Insul-Mastic 4010*, *553* or PITT CHEM *101* coal tar coating.
3. **Water Towers**—For interior, use tasteless, odorless PITT CHEM *104* coal tar coating. For exterior, use *Insul-Mastic 4010*.
4. **Waste Disposal Tanks**—Use acid and alkali-resisting *Tarset* or tough, heavy-bodied PITT CHEM *101*.
5. **Metal Wire Fences**—Apply weather-resisting PITT CHEM *102* coal tar coating with roller or brush.
6. **Concrete Structures**—Use *Insul-Mastic 4010* vaporseal or *Mica-Mastic 5402*, a synthetic resin coating containing white mica, specifically compounded for waterproofing and decorating masonry.
7. **Building Sidings**—Weatherproof with *Insul-Mastic 4010* and finish with *Insul-Mastic Color Coat*. Available in eight shades, *Color Coat* is specifically designed for use over PITT CHEM coal tar and *Insul-Mastic* coatings.
8. **Building Roofs**—Use *Insul-Mastic* roofing coatings outside. For condensation control and insulation on underside, use *Insul-Mastic 553*.
9. **Rolling Stock**—Apply *Insul-Mastic Dednox* coatings for protection of frames, box car ends and roofs of railroad cars.
10. **Underground Piping**—Use PITT CHEM *Tarset* or PITT CHEM *101* heavy duty coal tar coating.
11. **Exposed Piping**—Protect with *Tarset* or *Insul-Mastic 4010* and code with *Insul-Mastic Color Coat*.
12. **Structural Steel**—Apply economical, weather-sealing *Insul-Mastic 4010*.

THERE'S hardly a corrosion problem around your plant that can't be controlled with a PITT CHEM coal tar or INSUL-MASTIC gilsonite-asphalt coating. From ordinary weatherproofing to stopping tough chemical and underground corrosion, there's a PITT CHEM coating to do the job efficiently and economically.

Pitt Chem Industrial Coatings are available through leading Industrial Distributors. See the "Yellow Pages" of your telephone directory.



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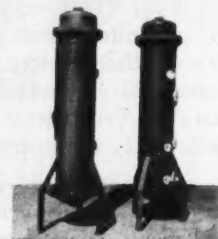
Check 2885 opposite last page



# "RUBBERHIDE"

## The Proven Solution to Effective CORROSION CONTROL

The success of "Rubberhide" Linings in providing effective, long-lasting protection against corrosion lies in the engineering experience and technical skill which Goodall is equipped to apply in producing compounds to meet specific problems.



Compounded from rubber or neoprene to assure proper resistance to the particular corrosive agents involved, these modern Linings will repay many times their cost through extended life of the products, parts or equipment to which they have been applied . . . regardless of size, shape or service requirements.

"RUBBERHIDE" Linings are processed to objects shipped to our Linings Plants in Trenton, Chicago or Houston; or, when the objects are too large for such shipment, or the work involves fixed plant equipment, experienced field crews do the processing "on location".

Whether factory or field processed, "RUBBERHIDE" Linings will assure positive corrosion control at important savings.

\* \* \*

### Other GOODALL Corrosion Control Products include

P.V.C. Linings, factory-applied in sheet form or by spraying; and "Allgood" Liquid Neoprene Coatings, in cans for brush-on application.

**"If it's GOODALL, it MUST be Good!"**

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AND OTHER INDUSTRIAL RUBBER PRODUCTS

## GOODALL Rubber Company

GENERAL OFFICES, MILLS and EXPORT DIVISION, TRENTON, N. J.  
BRANCHES AND DISTRIBUTORS THROUGHOUT THE UNITED STATES.  
IN CANADA: GOODALL RUBBER CO. OF CANADA LTD., TORONTO.

### CORROSION CONTROL

#### Double capacity range of impervious graphite centrifugal pumps

Uses: For handling corrosive fluids.

Features: Pump can deliver up to 150 gpm as compared to a top of 80 gpm for previous models.

Description: Impervious graphite centrifugal pumps are equipped with 1-, 1½-, and 2-hp, 1750-rpm motors. Larger models are available with 3- or 5-hp motors for



Motor-mounted corrosion-resistant impervious graphite pump can deliver up to 150 gpm

handling fluids of higher specific gravity than water. Maximum total head for each of the new types is 33, 51, and 67 feet, respectively.

(Karbate impervious graphite pumps are manufactured by National Carbon Company, Division of Union Carbide Corporation, 30 East 42nd St., New York 17, N. Y.)

Check 2887 opposite last page.

#### Corrosion test time cut from 2-6 weeks to 24-48 hours

Precise instrument used to evaluate alloys

One of the valuable tools in use at the new corrosion research laboratory of The Carpenter Steel Co., Reading, Pa. is a Corrosometer. This instrument measures corrosion by changes in electrical resistance of a given specimen. With it, corrosion rates can be obtained in 24-48 hours that formerly required two to six weeks of testing.

Carpenter Steel is presently using the instrument in four different ways: 1) comparing alloys for specifications, 2) evaluating what effect contaminants in the corrodent

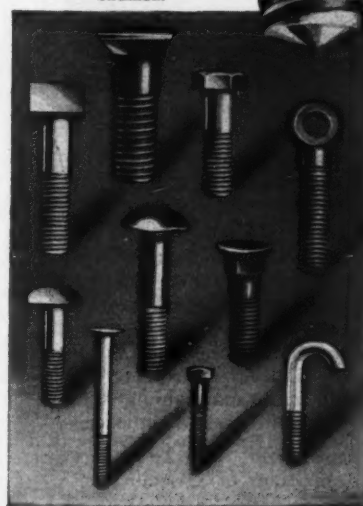
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lower cost  
**EYE BOLTS**  
by an  
exclusive method

Among Pawtucket's many specialty products are these lower-cost eye bolts or "swing" bolts. Pawtucket's exclusive production method keeps cost low, dimensional accuracy unusually high and strength above standard.

Pawtucket eye bolts are made in standard sizes ¼" and larger, or to your specifications. In any size, you can depend on uniform Class 3 fit, if required.

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## PAWTUCKET

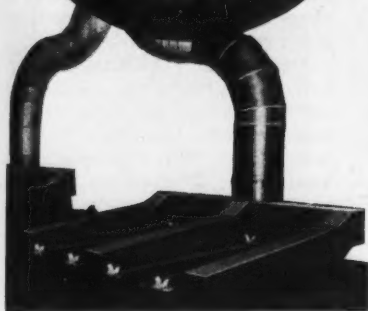
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327 Pine St. • Pawtucket, R. I.  
THE PLACE TO SOLVE YOUR BOLT PROBLEMS  
T.M. REG.

"The Bolt Man"

Check 2888 opposite last page  
CHEMICAL PROCESSING

Check 2886 opposite last page

## AGILE'S Plastic Ductwork Costs Less...Has Longer Service Life Than Stainless Steel



### AGILE'S Plastic Installation

- Cost ..... \$491.00
- Service....Still in use after 5 years

### Stainless Steel Installation

- Cost ..... \$581.00
- Service....only 16 months

**PROBLEM:** This company was using a type 19-9 stainless steel stack for venting the fumes on a sulphuric acid tank. This stack was installed at an original cost of \$581, was no longer serviceable after 16 months because of corrosion.

**SOLUTION:** The company replaced the stainless steel installation with a plastic structure of equal dimensions for \$491.00. The new stack still in perfect condition, has a life expectancy of many, many years.

Whenever you have a corrosion problem, check with American Agile. Many years of research and wide practical experience have made American Agile experts in the fields of plastics and corrosion prevention.

For detailed information be certain to write for your free brochure - AA-4



**American Agile Corp.**

Plant and General Office  
5461 Dunham Road + Maple Heights (Suburb  
of Cleveland), Ohio  
Mail Address - P. O. Box 148, Bedford, Ohio

Check 2889 opposite last page

## CORROSION CONTROL

have on corrosion rates, 3) checking the effects of velocity, and 4) checking the effects of variation in temperature.

Carpenter is now making up

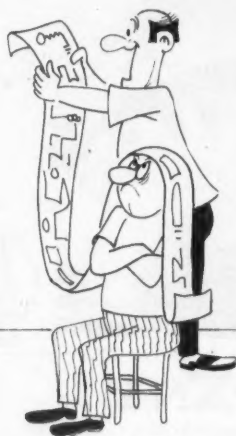


Corrosometer in use at Carpenter Steel research laboratory

a series of tubular probes to measure the effect of temperature on test results since it is known that temperature seriously affects electrical resistance. Effects of heat are measured by running steam through the probes. Laboratory uses several kinds of probes for maximum accuracy under all conditions.

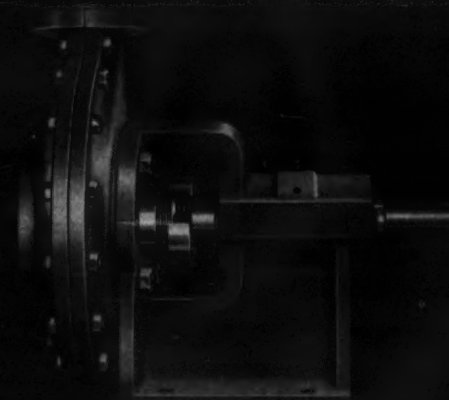
(Corrosometer is product of Crest Instrument Co., 11808 S. Bloomfield, Santa Fe Springs, California.)

Check 2890 opposite last page.



"And right here is where that new switch goes, Boss!"

## AMPCO<sup>®</sup> ELASTOMER-LINED CENTRIFUGAL PUMPS



## THE ONE ECONOMICAL, SAFE, DURABLE PUMP THAT HANDLES HCl

Eight sizes in stock — linings of natural rubber, Neoprene, and Hypalon. See your nearby Ampco Pump Distributor.

Saves you the extra expense of a special pump made from costly or dangerously fragile alloys — to handle muriatic acid — HCl, bleaching agents, mixed acids, cleaning solutions, plating solutions, abrasive slurries, and other destructive media.

Will not affect taste or color, nor introduce impurities into the material being pumped. Resists damage by stray currents in plating baths and from galvanic effects.

Capacities — heads range to 400 GPM and 100' TDH.

Write for free Bulletin P-6.

### AMPCO METAL, INC.

Dept. 139L, Milwaukee 46, Wisconsin • West Coast Plant: Burbank, California

P-34

## AMPCO<sup>®</sup> SPECIAL ALLOY AND NON-METALLIC CENTRIFUGAL PUMPS

Always depend on **AMPCO** when pumping corrosive media

Check 2891 opposite last page



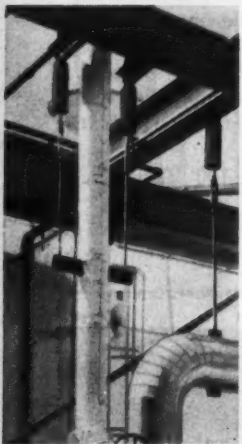
BLAW-KNOX has what it takes—to provide these products and services



**Large chrome moly pipe being readied for shipment to new generating station.** Making a right angle bend followed by a 24 degree, 18 foot bend in this heavy 27½ inch chrome moly pipe required all the skill and modern facilities of the Blaw-Knox power piping shop. Before shipment, piping is heat-treated and ultrasonically tested with a radar-type device for detection of any defects.

A new Blaw-Knox "6 x 6" Flexibility Matrix Method

of computing stresses in power piping systems is now available to consulting engineers, companies, and individuals responsible for the design of power piping systems. By the use of an electronic computer this method cuts calculating time from months to a day; assures full accuracy to six significant figures; and has no limitations on the complexity of the system. Write for further information about our new "6 x 6" Flexibility Matrix Method.



Two-way control over movement of piping is provided by Blaw-Knox functional spring hangers with the patented internal swivel action—shown in this modern outdoor generating station. Our experienced engineers are available to both design and make recommendations for your hanger requirements. To get full information, write for Catalog No. 54.

Each year serious fire strikes one out of every seven manufacturing firms in this country. Be safe. Let a Blaw-Knox fire-protection engineer study your needs—and explain how you can pay for the system on our lease or deferred payment plan. To get more information send for Bulletin No. 2426—"Fire Can Destroy Your Business."



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Complete facilities for prefabrication and erection of piping systems for all pressures and temperatures  
... complete line of standard and custom-engineered pipe hangers, supports and vibration eliminators  
... complete line of automatic sprinkler systems for standard and special hazards

Check 2892 opposite last page

## CORROSION CONTROL

### Nitric acid at 150°F has no effect on Teflon-lined pipe

**Problem:** A chemical plant in the Midwest had a corrosion problem with piping in a process involving nitric acid at 150°F and 65 psig, sparged at prescribed intervals with low-pressure steam.

**Solution:** In evaluating anti-corrosion materials, section causing worst problem was replaced with steel pipe lined with Teflon TFE-fluorocarbon resin. This 2'-diameter lined pipe was placed in service in April 1958.

Pipe is Schedule 40 carbon steel with welded steel flanges drilled for 150 psi. Liner in pipe and fittings is ⅛" thick virgin Teflon.

**Results:** A recent inspection of the Teflon-lined pipe section showed no signs of deterioration or leakage. Alloy pipe leading into and out of lined section had to be replaced twice during this same period.

Based on favorable experience with trial section, plant is redesigning rest of system to permit a switch over to the Teflon-lined pipe.

(Teflon-lined pipe and fittings are product of John L. Doré Company, PO Box 7772, Houston 7, Texas.)

Check 2893 opposite last page.

### Low-cost tank repairs eliminate expensive replacements

Equipment salvaged by simple, effective method

**Problem:** Large bulk storage tanks of 15,000 to 80,000 barrel capacity at Gulf Oil Company's facilities in Venezuela were leaking along sides and bottoms. These tanks are of riveted and also welded construction. Some of the holes in the roofs were ¾" wide to 8" in length.

Lighter gases were escaping and creating a definite fire hazard as well as a loss in revenue. Also, rain water entered these holes and caused further problems.



## CORROSION CONTROL

**Solution:** Materials consisting of approximately 80% steel and 20% plastic or 80% aluminum and 20% plastic were used to patch the holes in the tanks. First, surfaces of tanks were wire brushed and cleaned thoroughly. Then, steel-plastic



After surface is cleaned with wire brush, plastic steel or plastic aluminum material is trowelled into place over wire, forming effective seal of holes in metal plates

or aluminum-plastic material was applied over smaller holes and corroded areas. Wire mesh was placed over large holes, and steel-plastic or aluminum-plastic material was trowelled into place over wire.

**Results:** After three years, original repairs are still holding up. Gulf reports that by using this material costly bottom and roof replacing jobs are eliminated and effective seals of holes on metal plates are provided. Through use of repair materials, Gulf was able to salvage and prolong the service life of leaky storage tanks.

(Devcon A and Devcon F materials are products of Devcon Corporation, Danvers, Mass.)

Check 2894 opposite last page.

### Put TFE dispersions on heat-sensitive surfaces

Cured at 300°F or less

**Uses:** As a coating for machinery, molds, drums, extrusion dies, gaskets, bearings, conveyors, etc.

**Features:** Materials have low coefficient of friction, flexibility, chemical inertness, less than 0.01 moisture absorption, and excellent durability. In addition, they are able to



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The gent in the helicopter would really be "up-in-the-air" if he couldn't find his P.F.I. Standards.

Experience has taught him that the use of P.F.I. Standards saves time and money in the design, particularly in the fabrication and erection of high pressure — high temperature piping.

These standards, compiled by the Engineering Standards and Metallurgical Committees, are daily proving their worth from the design-drawing board stage through to final application of prefabricated piping in many types of industries.

Write for all ten P.F.I. Standards or indicate in the coupon below which ones could be helpful in your particular field.

### THE PIPE FABRICATION INSTITUTE

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- 1 Machining Backing Rings for Butt Welds
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Check 2895 opposite last page



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IMMEDIATE DELIVERY

## FOR NON-LUBRICATING AND CORROSIVE FLUIDS

*You asked for it...*

and Eco is the only manufacturer who has made it available. The first self-priming rotary gear pump suitable for non-lubricating and corrosive fluids is now available for immediate delivery. The pump, with 3/4" P.T. inlet and outlet ports, features housings of 316 or Carpenter 20 stainless steel, Hastelloy C or nickel, with reinforced Teflon gears and internal Teflon bearings and packing.

*Designated the GearChem\**, this pump is suitable for speeds to 1750 rpm at capacities to 10 gpm and pressures to 100 psi. Viscous media to 5000 SSU can be pumped at reduced speeds.

*The GearChem* created tremendous interest at the recent Chemical Show. In addition to proportioning and metering applications the pump is ideal for general process work in pilot plant and production operations.

Write for prices and complete information.

\* T.M. Applied For

Teflon—duPont trademark

# ECO

*the big name in small pumps*

Market 4-6565

## ENGINEERING CO.

12 NEW YORK AVE.  
NEWARK, N. J.

Check 2896 opposite last page

## CORROSION CONTROL

withstand temperatures ranging from -450 to 500°F or more.

Formerly, applications were limited to materials which could withstand high temperatures necessary for sintering — more than 700°F. These materials now make possible curing at 300°F or even less. Thus, lubricating, corrosion-resistant film can be applied to rubber, plastics, light metal, and many other heat-sensitive materials.

**Description:** Colloidal dispersions of Teflon tetrafluoroethylene resins in selection of binders with characteristics enabling application of plastic to heat-sensitive surfaces are available in two forms.

'Emralon' 310 is a dispersion of tetrafluoroethylene resins in a phenolic binder. Applied by spray, dispersion can be cured in one hour at 300°F. It exhibits low-friction properties of tetrafluoroethylene resins with durability of binder.

'Emralon' 320 is air-drying and designed for use on substrates even more sensitive to temperature, or for use where baking is not practical.

('Emralon' 310 and 'Emralon' 320 are products of Acheson Colloids Company, Division of Acheson Industries Inc., Port Huron, Mich.)

Check 2897 opposite last page.

## Polyethylene-lined tanks, pipes, and valves

Announcement is made of a successful method of applying polyethylene to steel surfaces as a lining for tanks, pipes, and valves. Surface of steel is specially prepared and polyethylene applied by a controlled heat treating process. Polyethylene linings have excellent resistance to 83% phosphoric acid, 90% sulfuric acid, alcohol, mineral oil, sour crude oil, aromatic solvents, and other chemicals.

(Polyethylene lining method is development of Tank Lining Corporation, 246 Washington Road, Pittsburgh 16, Pennsylvania.)

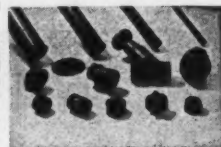
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## STOP CORROSION!

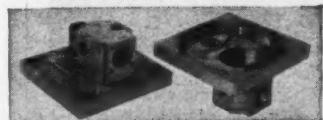
# LUZERNE PLASTICS

### PVC PIPE, FITTINGS & VALVES

Complete line of pipe, 1/4" to 12", Schedules A, 40, 80 and 120. Threaded and Socket Fittings and Valves available for immediate delivery. Send for Bulletin PF-1200.



### PVC CUSTOM MOLDED PARTS



Rigid polyvinyl chloride molded to customer specification. Sections specializing in heavy and intricate equipment parts. Send detailed drawings and service conditions for our recommendations and quotation.



### PVC LINING

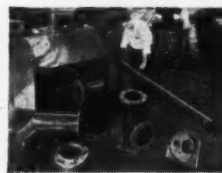
Rigid polyvinyl chloride lining of metal tanks, containers, ducts and other metal parts. Submit drawings and specifications for our recommendations and quotation.

### PVC ROLL COVERING



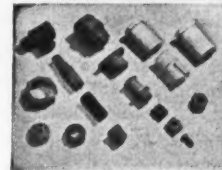
New Luzerne process for Rigid PVC roll covering. Numerous applications in cellophane, film, textile, paper, chemical and process industries. Send for Bulletin RC 9000.

### PVC FABRICATED PARTS



Fabrication and welding of rigid polyvinyl chloride sheet into many types of equipment and parts. Numerous applications for this fine plastic as fume hoods, duct work, tanks, containers and larger sizes of pipes.

### PLASTIC CUSTOM MOLDED PARTS



Acrylic, butyrate, nylon, polyethylene, polystyrene, rubber-resins, injection molded or transfer molded to customer specifications.

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Chemical Engineering Catalog

Write for complete information or contact  
our Sales Representative nearest you

## The LUZERNE RUBBER CO.

600 Muirhead Avenue

Trenton, N. J.

Check 2899 opposite last page

CHEMICAL PROCESSING



A complicated system for waste handling was not justified at this automated plant, so Kaiser Chemical borrowed from past experience and achieved . . .

## ***Simplified Waste Control Through Self-dumping Hoppers***

**Problem:** Very little waste or reject material is produced at a basic refractories plant in Columbiana, Ohio, because it is almost completely automated. Consequently, the plant, operated by Kaiser Chemicals Division of Kaiser Aluminum & Chemical Corporation, could not justify a complicated and expensive system for waste handling. However, some of the reject material, if properly segregated, can be reclaimed by reintroducing it into the process in controlled amounts. Therefore, it was desirable to establish a simple, efficient system for collecting this material.

One of the major difficulties to overcome was inaccessibility. In an automated plant, machinery is placed for optimum flow of materials and access is a secondary consideration. As a result, there are many "tight" not easily accessible places in the plant.

**Solution:** Benefiting from experience gained in another, though less automated, plant Kaiser established a simple system using low-cost self-dumping hoppers to collect the relatively small amount of waste.

The Columbiana plant makes basic refractory brick, ramming and mortar mixes for lining steel furnaces and other high-temperature applications. Except for the batching operation, the entire process is automated until bricks emerge from the

presses or until the ramming mixes are bagged. During these operations, 19 self-dumping hoppers, all of  $\frac{3}{4}$  yard capacity, are used regularly.

### **Hopper Uses**

Chromite received in railroad cars is emptied into a pit below the rail siding and carried by conveyor to storage bins. A magnetic pulley at the upper end of the conveyor removes tramp iron as a quality control measure. The tramp iron is then removed from the pulley by a scraper and falls into a chute leading to a hopper. Chrome ore received from the Philippines sometimes contains wood chips picked up from ship hulls. These are removed by a blower and sent through a duct to a hopper.

Storage bins above the scale room hold the various materials used in the manufacturing process, and it is sometimes necessary to change a bin from one use to another. All the remaining material in a bin is dumped into hoppers before the new material is added. In the scale room hoppers are also used to clean up spillage. If the spillage is usable, the hoppers are emptied on a conveyor leading to storage bins. If not, hoppers are taken to the dump.

A chute from the mixers, which are located above brick presses and baggers, leads to a

hopper so that mixers may be cleaned readily. This hopper sits in an enclosed shield with a canvas front cover to prevent a dust problem. Hoppers for metal scrap are stationed adjacent to shears and presses which fabricate metal casing for cased brick. These hoppers are carried outside to a truck provided by a local scrap dealer.

Dumping is an easy and simple operation. When a lock-handle is released, the hopper tilts forward to dump itself and returns to an upright position, locking automatically.

Hoppers are also used for

experimental purposes. Recently, one was used to help determine whether a new dust routing system was advisable. The dust created in crushing and screening is currently being removed by a centrifugal blower and carried by duct to a conveyor leading to storage bins. To determine whether the quantity of dust was sufficient to merit conveying it directly to storage, a hole was cut in the duct and dust was routed into a hopper. Material in the hopper was weighed daily to find the quantity produced during an average period.

Generally, any long-dis-



When positioned under chute leading from mixer, hopper is completely enclosed to prevent dust problem



Mounted on dolly, hopper can be easily positioned in "tight" places and removed without difficulty



# HNO<sub>3</sub>

**nitric acid—in any concentration,  
at any temperature to 500°F,**

## CAN'T CORRODE FLUOROFLEX®-T PIPE

liner of TEFLON® in  
thermal equilibrium with housing

Lining is completely inert to all corrosives. It's made of Fluoroflex-T, a high density, non-porous compound\* of virgin Teflon.

Liner and housing are in thermal equilibrium through an exclusive process developed by Resistoflex. It compensates for thermal expansion differential between the Teflon and the pipe housing, eliminating fatigue collapse, and cracking at the flange.

Handling a 50% solution of boiling nitric acid at 355°F and 50 psi, Fluoroflex-T Type S piping components have been in service for almost two years with *no failures*.

Fluoroflex-T Type S piping systems can handle the toughest problems of corrosion, erosion, and contamination for you, too—with complete safety. Bulletin TS-1A gives details. Write Dept. 154, RESISTOFLEX CORPORATION, Roseland, N. J. Other Plants: Burbank, Calif., Dallas, Tex. \* Pat. No. 2,752,637

© Fluoroflex is a Resistoflex trademark, reg., U. S. pat. off.  
© Teflon is DuPont's trademark for TFE fluorocarbon resins

## RESISTOFLEX

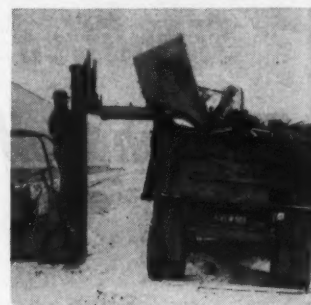
Complete systems for corrosive service

LINED STEEL PIPE • FLANGED FLEXIBLE HOSE • BELLOWS • ELBOWS • TEES • REDUCERS • DIP PIPES & SPARGERS • LAMINATED PIPE

Check 2900 opposite last page

### HANDLING & PACKAGING

tance moving of the hoppers is handled by one of the fork trucks normally used for palletized shipments. Since waste materials accumulate rather slowly, hoppers do not have to be moved frequently and it is not necessary to assign a fork truck to this job perma-



When lock-handle on rear of hopper is released, hopper tilts forward, dumps itself, and returns to upright position

nently. When a hopper needs emptying, it takes only a few minutes by a fork truck.

**Results:** Because the hoppers permit segregation, some of the reject material can be reintroduced into the process. Also, their small size and mobility make it possible to position them easily in "tight", comparatively inaccessible places in the plant.

Movement and dumping of the hoppers is accomplished either by hand or by fork truck. The self-dumping feature makes dumping a matter of seconds, eliminating manual unloading. Due to their simple and sturdy construction, the hoppers do not require maintenance.

By using the self-dumping hoppers Kaiser has solved its waste handling problem in a simple, inexpensive manner.

(Self-dumping hoppers are product of Roura Iron Works, Inc., 1407 Woodland Ave., Detroit 11, Mich.)

Check 2901 opposite last page.

For more information on developments reported in this section, check corresponding numbers on Reader Service Slip opposite last page of this issue.

## HANDLING & PACKAGING

### Quick, easy installation on existing conveyors is scale feature

**Uses:** For indicating, recording, totalizing, proportioning, or programming rate of flow of material in terms of weight.

**Features:** Unit can be easily installed on existing flat-belt or trough-type conveyors with minimum of downtime and only slight modification. It is adaptable to either fixed or variable-speed conveyors.

**Description:** Unitized, pneumatic, belt conveyor scale is available in variety of sizes to handle large range of capacities. Scale employs a flexural frame arrangement which eliminates all effects of side thrust and eccentric loading on conveyor, delivering single component of force.

Entire scale is mounted above conveyor on rigid platform supported by four vertical members. A-shaped hanger arms, connected to idlers under section of conveyor belt, transmit weight of material passing over this section to a pneumatic weight transmitter through a flexural frame assembly. Pneumatic signal from transmitter is delivered to readout units which perform automatic control functions as listed above.

(Unitized belt conveyor scale is product of Weighing and Control Components, Inc., 437 Lincoln Rd., Hatboro, Pa.)

Check 2902 opposite last page.



"Here is where we find out just how good the sharp-turn feature of this machine really is."

# CHIKSAN



### PREVENTS LINE HANDLING INJURIES SPEEDS BARGE LOADING ELIMINATES HOSE BURSTS SLASHES REPLACEMENT COSTS

The Chiksan Barge Loading Arm ends hazardous manhandling of loading hoses, eliminates dangerous dock clutter. Mechanical operation makes hookup fast and simple.

Gear reduction enables one man to adjust the flange position anywhere in a 105° vertical range. Outboard arm is manually swung into position at any point in a 130° horizontal arc. The eight inch model rotates 360° to permit servicing barges on both sides of a narrow dock. Once hookup is made, the arm can be left unattended while free wheeling allows the unit to ride free during loading and unloading. When not in use, the arm is raised up and out of dockside traffic.

6" x 25' and 8" x 28' sizes available. Handle petroleum products, both black and bright, and mild caustics in any temperature ranging between -60° F. to +225° F. Service all river and lake barges and lake tankers including those in 25,000 barrel class.



The Chiksan Barge Loading Arm is designed to reach approximately 20 feet from dock riser to barge flange. Total length of Arm is 25 feet.



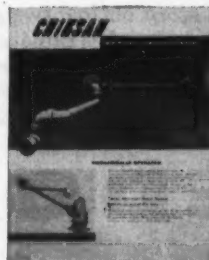
## CHIKSAN

A SUBSIDIARY OF  
FOOD MACHINERY AND CHEMICAL CORPORATION



**CHIKSAN COMPANY — BREA, CALIFORNIA**  
CHICAGO 5, ILLINOIS • NEWARK 2, NEW JERSEY

Well Equipment Mfg. Corp. (Division), Houston 1, Texas  
Subsidiaries: Chiksan Export Company  
Chiksan of Canada, Ltd.



**CHIKSAN COMPANY**  
330 No. Pomona Ave., Brea, Calif.

Please send me your Barge Loading Arm Bulletin #456.

Name \_\_\_\_\_  
Title \_\_\_\_\_  
Company \_\_\_\_\_  
Address \_\_\_\_\_  
City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_

58-36

Check 2903 opposite last page

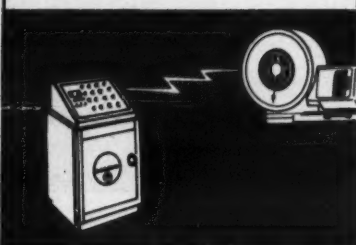




## NEW TOLEDO PRINTWEIGH "400"

*Advanced design for  
industry's growing weight-control needs!*

- Prints where you wish on full 8½ x 11 forms, or on tickets; also on strips.
- Prints full figures, even when unit weights are used.
- 6 to 12 bank selective numbering, or up to 10 weight symbol keys, available for positive weight identification. Consecutive numbering.
- Date and time may be printed automatically.
- Meets industry's need for better weight control with new flexibility.



### REMOTE RECORDING, TOO!

Printweigh can give wings to weight data... transmit it to remotely located adding or other office machines. Brings welcome flexibility to weighing operations!

With the new Printweigh 400 you can police your costs with new effectiveness... arrest profit-stealing errors and inefficiencies! Printweigh 400 gives you a welcome source of precise, basic printed information on materials received, processed, transferred or shipped. It's applicable to the full range of new Toledo dial scales... offers you the widest choice of optional features, including a "memory" for printing weight data even after the load is removed!

This versatile new weighing development is a product of Toledo's continuing research and development program to provide industry with even higher levels of weighing performance. Ask your Toledo representative for the full story on Printweigh 400, or write today for Bulletin 2017 TOLEDO SCALE, Division of Toledo Scale Corporation, 1423 Telegraph Road, Toledo 12, Ohio.



**TOLEDO**  
Headquarters for Weighing Systems

Check 2904 opposite last page

## HANDLING & PACKAGING

Design and specify your own belt conveyor with this eight-page engineering guide that contains aids such as nomographs, tables, line drawings, and graphs. Guide greatly simplifies calculations of dimensions, horsepower requirements, pulley diameters, and idler-roller spacing. Information on properties of both carbon and stainless-steel belts, methods of support, end joints, inclines, belt tensions, and other necessary information is included. Engineering Guide — Sandvik Steel Belt Conveyors, Div. of Sandvik Steel, Inc., 1702 Nevins Rd., Fair Lawn, N.J.

Check 2905 opposite last page.

### Hand-propelled units quickly converted to power

**Uses:** For conversion of hand-propelled equipment to power propulsion.

**Features:** No change of existing running gear is necessary for installation of unit.

**Description:** Power propulsion unit can be permanently attached to a single truck or can be quick-coupled with a fleet of trucks. Forward motion, reverse motion, steering and brake are all in one compact unit.

Load being moved is not carried by driving wheel. Wheel carries only weight of propulsion unit itself. Wheel rides up and down freely to compensate automatically for floor irregularities.

Automatic, self-adjusting braking system features dead-man brake. Unit is available in 3000 gvw and 8000 gvw capacities for permanent attachment to any vehicle having its own battery. It is also available in same capacities for either permanent or quick-coupling attachment to vehicles not having their own battery.

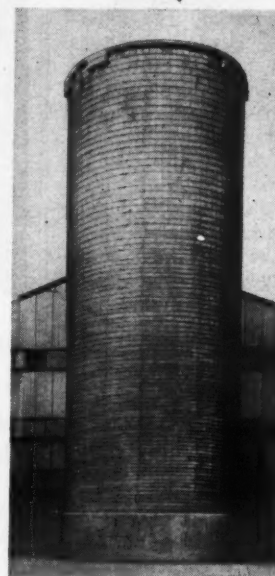
(Powr-wheel is product of Vanguard Engineering Co., 1908 E. 66th St., Cleveland 3, Ohio.)

Check 2906 opposite last page.

Drum reconditioning method and economic benefits are discussed in four-page reprint, "Your Drum Can Make More Trips" — L. M. Gilbert Company, 422 Bourse Bldg., Philadelphia 6, Pa.

Check 2907 opposite last page.

It's what's  
**INSIDE**  
that counts!



Most storage bins  
look good on the outside,  
**BUT...**

- 1 Have they been built to meet the required method of loading?
- 2 Is the storage area and inside wall built to favor the characteristics of the material to be stored?
- 3 Will the flow of the material meet the required volume and rate of flow at the point of discharge? We at Neff and Fry make it a point to see that all three requirements are in balance.

**NEFF & FRY COMPANY**  
166 Elm St., Camden, Ohio



It's the **STAVE**  
that makes the difference

Check 2908 opposite last page

CHEMICAL PROCESSING



THAT'S  
INTERESTING

**Accelerates  
hardening  
of tricalcium  
cements**

By moistening dry ingredients of tricalcium cements with water containing silicic acid made by neutralizing sodium silicate, a Belgian inventor accelerates hardening. Wet powder is molded under high pressure, then immersed in a zinc solution and the silicic acid. Hardening with new process is instantaneous, whereas normal hardening is said to be a matter of months. (Silicate P's & Q's, Philadelphia Quartz Company)

**Taped up?  
let'er rip**

Aerosol spray makes it easier to rip off taped bandages, and greatly reduces the discomfort. Pre-tape dressing is non-irritating adhesive bond that eliminates preliminary shaving or application of alcohol to skin when treating athletic injuries.

For more information on product at right, specify 2909 see information request blank opposite last page.



Simoniz  
puts "protection"  
in a can

Packomatic®  
puts the cans  
in a case



Packomatic equipment feeds, forms, positions, loads, seals and imprints corrugated shipping containers automatically. However you ship—in multi-ply paper bags, or in corrugated shipping containers; whatever you "package"—a can, a carton, a box or a bale—there's a Packomatic machine designed to handle your shipping container requirements. Packomatic machines, geared to your production line, will feed, form, position, load, seal and imprint corrugated containers automatically—or do any of these operations singly as a complement to your existing packaging facilities. Let one of our sales engineers suggest the start of a long-range packaging program for your plant. Investigate the Packomatic method of cutting costs and boosting production. Call, write or wire today.

**Fully-automatic Packomatic Case Former-Loader**, part of a fully-automated production line at the Simoniz plant, Kankakee, Illinois. Other Packomatics on the Simoniz line include Case Sealers and Case Imprinters.



Begin to automate your packaging line with this high-speed, fully-automatic Case Sealer. Aligns loaded cases, positions flaps, glues, seals and discharges—and no operator needed! Available in wide range of sizes. Semi-automatic, too. Call or write for additional information.

**J. L. FERGUSON CO. Joliet 6, Illinois**

PACKOMATICS include the Bale Sealer • Case Sealers • Opener-Loaders • Case Imprinters • Telescoping Volumetric Fillers • Packer-Glueers • Semi-automatic or fully-automatic.

MOBILE  
GAS  
STORAGE  
WHERE  
YOU  
WANT  
IT  
WITH



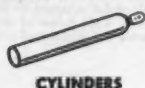
**TW** **GAS TRANSPORTS**

Oil refining, petrochemical, food processing and electronic companies have found these TAYLOR-WHARTON transports convenient, flexible and economical for inter-plant haulage and standby equipment. Bulk storage — 25,000 to 100,000 cu. ft. — of oxygen, nitrogen, hydrogen, argon, helium, compressed air and ethylene can be handled with ease.

Each transport consists of a number of 2400 p.s.i. seamless steel storage pressure tubes, valved and manifolded together to a single common outlet in a rear mounted weatherproof cabinet. The tubes themselves, completely heat-treated and meeting I.C.C.-3A2400 specifications, are rigidly mounted on standard semi-trailer chassis.

More than a Century in Harrisburg 24, Pa.

**H HARRISBURG STEEL CO.**  
Division of HARSCO CORPORATION



CYLINDERS



TUBES



FLANGES



COUPLINGS

Check 2910 opposite last page

## HANDLING & PACKAGING

**Cuts time and cost of bulk adipic acid handling, unloading**

**Uses:** Primarily, for bulk shipments of adipic acid.

**Features:** Container cuts time and cost of unloading and handling bulk quantities of adipic acid. Less warehouse storage space is required because containers can be stacked at least two high. Container can be re-used as bulk package for a manufacturer's end product. Since there is no leasing involved with non-returnable container, records are unnecessary.

**Description:** Bulk shipping unit consists of 57"-long corrugated fiberboard tube, or sleeve, encased in a flanged rectangular corrugated body (33½ x 33½ x 57"). Interior surfaces of container contacting adipic acid have special water-resistant finish. Top and bottom of container have easily removable corrugated covers (36 x 36), for quick emptying. Entire unit rests on built-in pallet.

Thirty-nine containers can be shipped in a standard box car — 78,000 lb of adipic acid that can be quickly unloaded by single fork truck.

("Pillar-Pac" is development of E. I. du Pont de Nemours & Company, Wilmington 98, Delaware.)

Check 2911 opposite last page.

**Cuts handling time, safeguards shipment**

**Unloading time reduced almost 20 manhours**

**Uses:** As package unit for shipping pails.

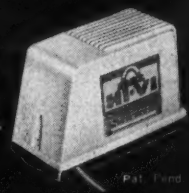
**Features:** According to manufacturer, tests prove that time required to unload a carload of pails is cut from 21½ to 2½ man-hours. Package holds containers rigid and guarantees safe shipment with no turning or scratching.

**Description:** Package unit consists of top and bottom caps of corrugated board between which 27 steel pails are packed in three layers. Two strong steel straps hold en-

## NEW! ERIEZ HI-VI VIBRATORY FEEDERS & BIN VIBRATORS

specially constructed for  
**HAZARDOUS, DUSTY LOCATIONS**

FULLY  
ACCEPTABLE  
BY  
MILL MUTUAL  
FIRE  
PREVENTION  
BUREAU



**Only Mill Mutual Acceptable electro-permanent magnetic vibratory equipment at economical prices!**

**Vibratory Feeders** — accurately feed and control bulk materials, from ounces to tons. Completely enclosed drive element, built-in glass fiber springs, impotted epoxy sealed electrical coil. Needs no rectifier.

**Unit (Bin) Vibrators** — keep hard-to-move materials flowing through bins, chutes, etc. Exclusive pinpointed vibration impact. Completely enclosed and sealed. No sliding or rotating parts to wear. No rectifier needed.

WRITE FOR BIG VIBRATORY FACT FILE  
Eriez Mfg. Co., 73M Magnet Dr., Erie, Pa.



Check 2912 opposite last page  
CHEMICAL PROCESSING



## HANDLING & PACKAGING

tire assembly firm. Pails can be stored 15-high instead of 9- or 10-high, thus increasing usable storage space 20 to 40%. Caps and straps can be used for reshipment of filled containers.

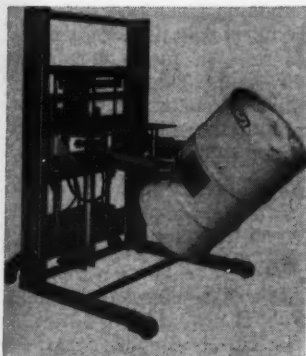
("Handy-Pak" unit is product of Bennett Industries, Inc., Peotone, Ill.)

Check 2913 opposite last page.

### Grabs, lifts, dumps drums up to 55-gal capacity

**Uses:** For unloading drums and other cylindrical objects from trucks, and double- and triple-decking for storage.

**Features:** Device can grab, lift, and dump drums of up to 55-gal capacity, and will lift rolls of up to 1000 lb. It has 360° rotation and 90° tilt.



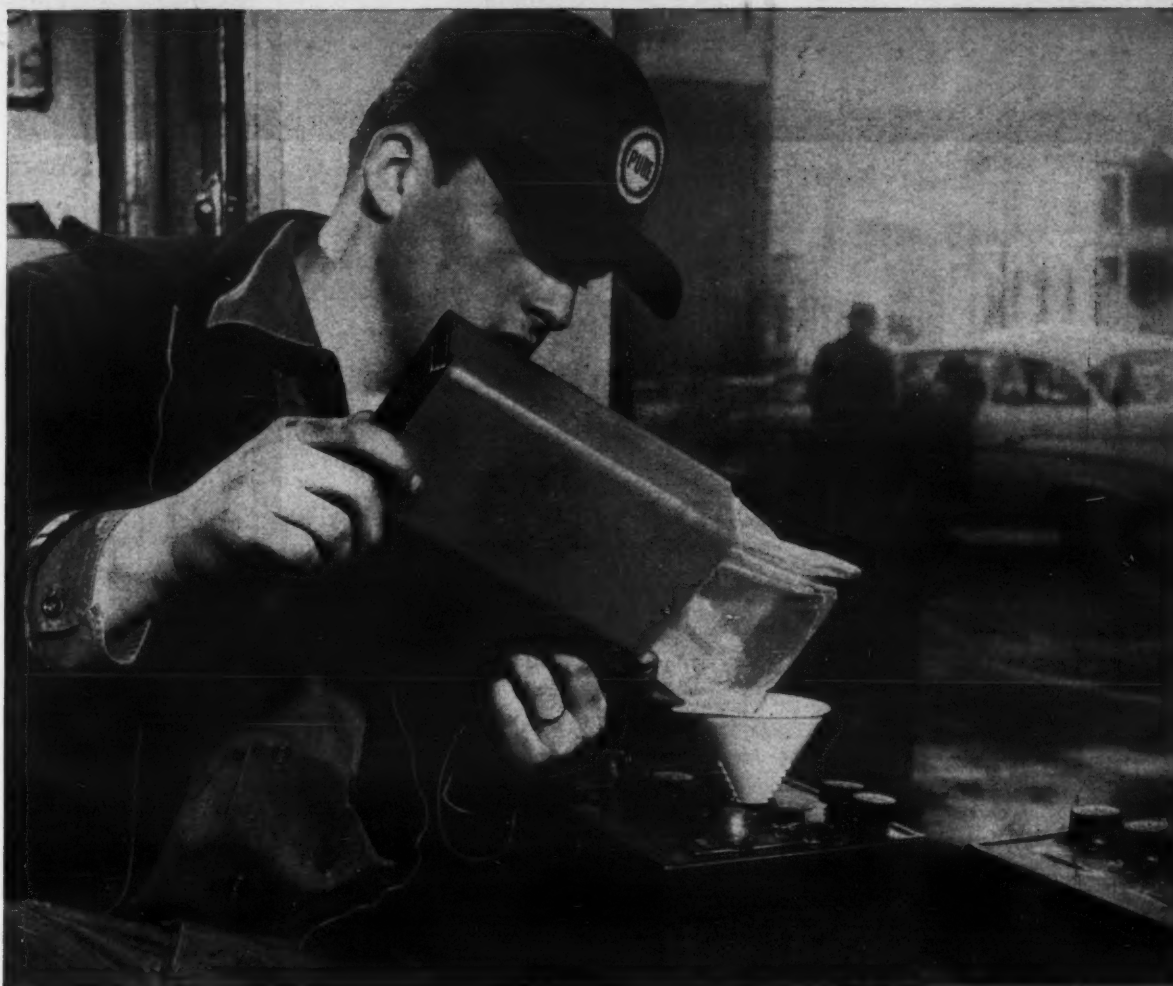
Portable dumping lifter will carry containers to processing, dump their contents, and return container to storage

**Description:** Portable dumping lifter has two separate hydraulic systems. Lifting is battery-operated, with hand operation for clamping. Arm spreads are 18 to 38" in diameter.

Clamps will operate to within 6" of floor. Lifting speed is 15 fpm, with total lift of 52". Rubber-lined grab shoes permit handling of smooth surfaces without damage.

(Portable dumping lifter is product of Special Products Div., The Colson Corp., Somerville, Mass.)

Check 2914 opposite last page.



## How to ship battery acid in a cardboard box!

Battery manufacturers have long known of the economics to themselves and dealers of shipping dry charged batteries. Now, thanks to VISQUEEN "L" film, this is an accepted method.

The "L" film, made only by VISKING Company, and first used in the Navy's stratosphere balloons, is as pinhole free as a polyethylene film can be. It made the perfect liner for cardboard packages designed to contain exactly the right amount of acid for a given battery.

Result—acid shipped at minimum cost and loss. When

the acid is added to the dry charged battery it is in perfect condition and fully charged at the moment of sale.

If yours is a difficult product to store or ship, VISQUEEN "L" film may be the answer. But be sure you get VISQUEEN film. Don't be fooled. No other film is as uniform, as free from thin spots and blemishes, as VISQUEEN film.

Write for full information about VISQUEEN film and your product, or use the Information Request Tag.



**VISQUEEN film—first and foremost polyethylene film.**  
A product of the long experience and outstanding research of  
**PLASTICS DIVISION**  
**VISKING COMPANY** Division of **UNION CARBIDE Corporation.**  
6733 West 65th Street, Chicago 38, Ill.

In Canada: **VISKING COMPANY DIVISION OF UNION CARBIDE CANADA LIMITED,**  
Lindsay, Ontario.

**VISQUEEN, VISKING and UNION CARBIDE** are registered trademarks of  
**Union Carbide Corporation.**

Check 2915 opposite last page



# 15 YEAR RECORD

## RAYMOND ROLLER MILLS on grinding PHOSPHATE ROCK

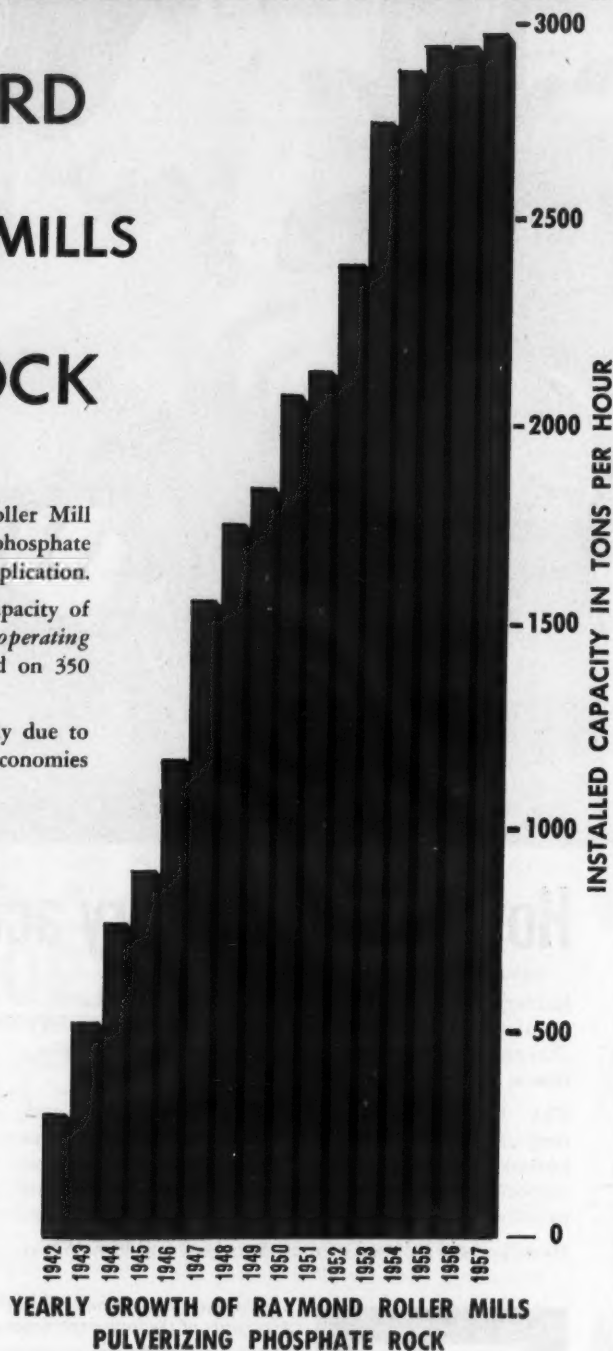
IN the past 15 years more than 200 Raymond Roller Mill installations have been seen pulverizing phosphate rock for acidulating and manufacturing direct application.

As shown in the chart, this brings the installed capacity of Raymond Roller Mills to nearly 3000 tons per operating hour, or in excess of 16,000,000 tons yearly, based on 350 2-shift a day operation.

This phenomenal endorsement by industry is mainly due to the following advantages which add up to record economies year after year.

1. Lowest initial cost, power cost, and overall operating costs.
2. Dependable, long service life, backed by over 70 years' experience.
3. Ability to handle all known deposits with a wide range of capacities available.
4. Automatic, dust-free operation with a very minimum of attention.
5. Optimum particle size distribution and ease of fineness control.
6. Ability to dry, grind, separate and convey in one simple operation.
7. Minimum space requirements and flexibility to meet plant layout.
8. Low maintenance.
9. Active research and development over the years by Raymond to further improve grinding efficiency.
10. Competent engineering and operating service.

*With a problem in this or a similar field, check the facts and compare. When put to test, Raymond proves best.*



YEARLY GROWTH OF RAYMOND ROLLER MILLS  
PULVERIZING PHOSPHATE ROCK

# COMBUSTION ENGINEERING, INC.

*Raymond Division*

1317 North Branch St.  
CHICAGO 22, ILLINOIS

Combustion Engineering-Superheater Ltd., Montreal, Canada

SALES OFFICES IN  
PRINCIPAL CITIES

Check 2916 opposite last page

## HANDLING & PACKAGING

### Mineral erosion losses can be controlled by protective crust

**Uses:** For preventing losses of fine minerals and coal due to erosion by wind and rain-storm.

**Features:** Full crust protection is afforded about six hours after spraying. Protective crust is insoluble in water so that it does not leach away in rain and moisture. Tests indicate binder is non-corrosion and non-toxic.

**Description:** Mineral binder is a water emulsion of a synthetic resin. It forms protective crust when sprayed on exposed surfaces of coal and minerals when they are in open storage or in-transit in open railroad cars.

Solution of binder is made up merely by diluting with water to any strength that may be required to meet prevailing conditions. Solution containing from 3 to 15% solids by weight is effective, in general, to meet most requirements. This range of solution strengths corresponds to dilution ratios of from 16 to 1 up to 2.3 to 1.

(Aerospray 52 binder is product of American Cyanamid Co., 30 Rockefeller Plaza, New York 20, N. Y.)

Check 2917 opposite last page.

### Mobile pneumatic unit keeps things moving, cuts handling cost

**Provided 80% labor savings, upped plant efficiency**

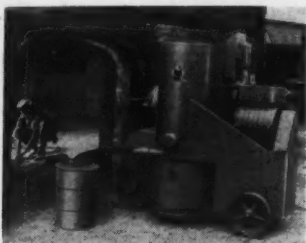
**Uses:** Unit is designed to provide rapid, safe movement and recovery of such materials as rock granules, plastic pellets, and gritty or pulverized substances. Unit also conveys wide variety of dry materials and corrosive chemicals.

**Features:** Machine easily turns its own length, can be wheeled to any location in the plant, and immediately put to work on otherwise hard to get at materials. It is said to have provided 80% saving in labor costs and increased plant efficiency by 20%.

## HANDLING & PACKAGING

**Description:** Mobile pneumatic system is equipped with inlet valves to take standard size 1½ to 2 inch vacuum hose. Unit can be used as vacuum cleaner when not in use as portable conveyor.

Mobile conveyor handles from 50 to 100 lb per minute continuously or intermittently, depending on requirements. Where quantities exceed 7½ cu ft, standard 55-gal drums



Mobile pneumatic conveyor can be wheeled to any location in plant and immediately put to work on otherwise hard to get at materials

can be used as auxiliary collectors. Adaptor covers provide inlet and outlet connections. Covers are held in place by vacuum—can be shifted easily from one standard 55-gal drum to others as needed.

Overall length of unit is 76", and overall width is 39". Height to top of crane hook is 74" and net weight is 1500 lb. Unit has 10 hp motor, and vacuum at machine is 8.5" of mercury. Slightly larger unit weighs 1550 lb, has 15 hp motor, and vacuum at machine is 9.5" of mercury.

(Hoffco-veyor is product of Dept. LL, U. S. Hoffman Machinery Corp., 103 Fourth Ave., New York 3, N. Y.)

Check 2918 opposite last page.

**Oil filter replacement tips** for manufacturer's tractor engines are presented in helpful eight-page booklet. Cost-study information is presented with recommendations for extending oil change period. Cutaway photographs show inner parts of filter elements and point out design characteristics. Available in English, French, Spanish and Portuguese is "Not An Element Of Doubt", Form DE839 — Caterpillar Tractor Co., Peoria, Illinois.

Check 2919 opposite last page.



## BIG PART OF U.S.

Architect's rendering of the new Bagpak plant in Litchfield, Ill.

## GETS FAST SHORT-HAUL DELIVERIES OF INTERNATIONAL MULTIWALL BAGS!

You benefit directly from International Paper's modern, new Bagpak plant in Litchfield, Illinois.

If your plant is situated in the heart of this busy mid-western market, you now have an even closer source for the full line of International multiwall bags.

Industry in other parts of the United States benefits by faster and better service too. For Litchfield's capacity eases the demand on our other plants and warehouse facilities.

With this increase in manufacturing facilities and distribution efficiency, it will pay you to remember that wherever you are, you're never far from International Paper . . .

*your most dependable source of supply . . .*

**INTERNATIONAL  
PAPER**

BAGPAK DIVISION, N. Y. 17, N. Y.

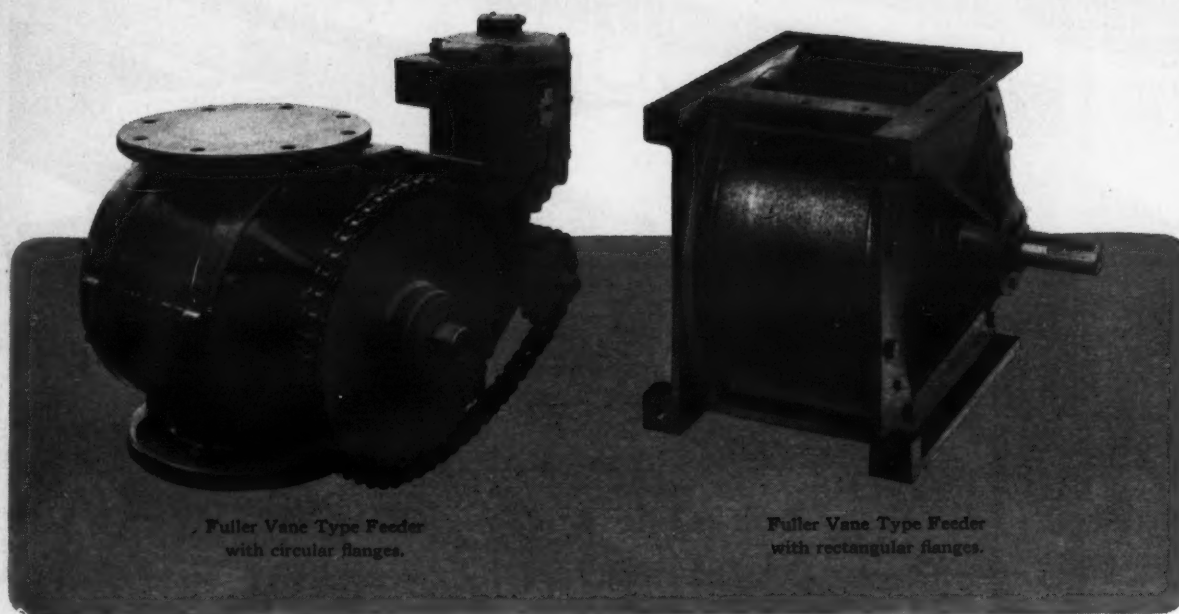


Check 2920 opposite last page

# Fuller Feeders

## Keep Conveyors Flowing Freely

... whether the load  
is a few pounds a minute  
or many tons an hour



Fuller Vane Type Feeder  
with circular flanges.

Fuller Vane Type Feeder  
with rectangular flanges.

Fuller Vane Type Feeders assure you of dependable handling of dry, pulverized and granular materials. They're available in capacity ranges to meet all normal plant requirements, and are built with circular or rectangular outlets. Check these Fuller cost-saving features . . .

**Extra-rugged construction.** Heavy, cast iron body walls and headplates add rigidity, longer life. Stainless or other metals can be used where sanitary or corrosion requirements demand their use.

**Sealed bearings** are equipped with Alemite

fittings for ease of lubrication and long life. Abrasive particles can't enter, maintenance is cut.

**Make effective air locks.** Fuller Vane Type Feeders can be used as air locks for pressure differentials up to 3½ lbs.

**Stuffing boxes** and ball bearings for vacuum, low-pressure and general applications.

And, where extreme volumetric accuracy without pulsation is needed, there's a line of Fuller Roll Type Feeders. For full details on Fuller Feeders write for Bulletin.

See Chemical Engineering Catalog for details and specifications .

1306  
P-20



### FULLER COMPANY

136 Bridge St., Catasauqua, Pa.

SUBSIDIARY OF GENERAL AMERICAN TRANSPORTATION CORPORATION  
Birmingham • Chicago • Kansas City • Los Angeles • San Francisco • Seattle

### HANDLING & PACKAGING

#### Low-cost printing on five-gal pails by portable unit

**Uses:** For printing on five-gallon pails.

**Features:** Unit will produce lithographic quality printing without expense of short runs of lithography. One inexperienced operator can handle up to 500 pails per hour.

**Description:** Portable printing device is equipped with casters and weighs only 160



Printing identification, instructions, on five-gal pails is easy, fast, and inexpensive with this portable printer

lb. It is operated mechanically, and requires no electric or air power.

Machine uses rubber printing plates molded from standard typographic forms or hand set by assembling rubber type on an interlocking base. Each plate is reported to be good for many thousands of impressions. Printing area is 9 by 14". Type as small as ten point may be reproduced satisfactorily, permitting many times the amount of copy possible with stencils.

Ink, available in most colors, dries to touch when applied. Pails just printed may be put into production lines immediately. Two colors may be applied simultaneously, and plates and colors may be changed in a matter of seconds. Printing is said to be practically indestructible under normal handling and weather conditions.

(Chapco Print-A-Can printer is available from Bennett Industries, Inc., Peotone, Ill.)

Check 2922 opposite last page.

Check 2921 opposite last page

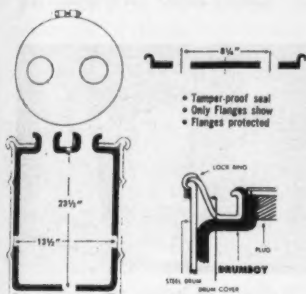


## HANDLING & PACKAGING

### Plastic-lined steel drum cuts handling costs for corrosives

**Uses:** As a container for corrosive materials.

**Features:** Lightweight unit has steel-drum tariff designation, thus effecting considerable savings in shipping. Be-

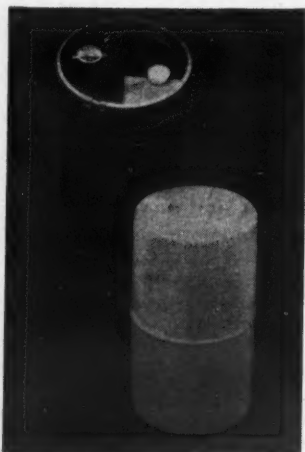


Injection-molded unit can be filled and emptied with standard polyethylene fillers and spouts

cause units can be palletized, storage costs can also be reduced.

**Description:** Steel drum with polyethylene insert has 15-gal capacity. Injection-molded of virgin polyethylene, drum has 3/4" polyethylene plugs and can be filled and emptied with standard polyethylene fillers and spouts. Drum has double openings in head, each 1 1/2" in diameter.

(Drumboy container is product of Drumboy, Inc., 16 Hudson St., New York 13, N.Y.) Check 2923 opposite last page.



Steel drum with polyethylene-lined insert offers ease of handling and product purity



## Trims handling costs almost 90%

**SAVES 21 MANHOURS OF HARD LABOR  
DAILY ON ONE OPERATION ALONE**

H. Swoboda & Son, Inc. of Philadelphia have taken a lot of the hard physical labor out of their leather tanning operations and cut operating costs at the same time.

It all started when Chief Engineer, E. C. Sharpless, looked for a better way to load their waste materials—hide trimmings and flesh—into trucks. He recommended a tractor-shovel to do the job, so competitive makes were called in to demonstrate, with the result that a Hough model H-25 "PAYLOADER" with an open-tine type bucket was purchased. It was found that this machine could easily load 53,000 lbs. of material in 3 hours—as much as three men with pitchforks could do in an 8-hour day, or 24 manhours. Needless to say, this was just a beginning for the versatile

"PAYLOADER", as it is being applied to other materials handling jobs around the tannery.

Swoboda's decision to purchase the H-25 rather than a competitive machine was based not alone on greater production, but also on mechanical and operating advantages. More power, greater lifting capacity, exclusive non-spin differential that gets traction even on their slippery floors, and speed and ease of maneuvering in congested plant areas were some of its features that they found important in their operations.

Operator's safety and comfort and ease of operation were also noted due to the power-steer, power-shift transmission, underslung safe boom arms and low, stable load-carry position.

Bob Merrell of the Swoboda staff—an experienced front-end loader operator—gave his opinion of the model H-25 in a few well-chosen words, "Man this is the greatest—handles more, loads more, faster than anything else... easy to get in and out of tight places."

If you have bulk, loose materials to move, better have a demonstration of the model H-25. You'll find it's the "greatest" too... that it can do many tough materials handling jobs at low cost. Ask your "PAYLOADER" Distributor about Hough Purchase and Lease Plans also. The Frank G. Hough Co., 744 Sunnyside Ave., Libertyville, Ill.

10-A-2

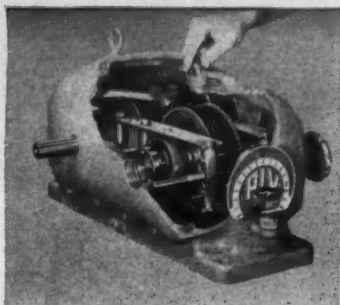


Check 2924 opposite last page

# How Link-Belt P.I.V. provides stepless speed control

By employing a positive chain drive to transmit power, Link-Belt's P.I.V. (Positive, Infinitely Variable) variable speed drive provides instant and positive speed settings, with no perceptible loss of speed regardless of load. Stepless variation of any speed from maximum to minimum can be obtained instantly, even while operating at full load.

The chain which forms the "heart" of P.I.V. is a self tooth-forming chain consisting of a series of overlapping steel laminations which serve as teeth and are free to move from side to side, singly or collectively (see below). This ingenious chain fits into radially grooved wheels (see below) which have teeth cut at a constant depth but of increasing width toward wheel periphery.



P.I.V.'s are compact, permitting installation as either a separate unit or as a built-in part of the driven machinery. Exceptional application flexibility can be accomplished by

incorporating both motor and helical gear sets integrally with the P.I.V. drive.

By means of pneumatic, electronic, hydraulic or mechanical controls, P.I.V.'s can be used to synchronize machine components or complete machines with a precision matched by no other method. Whether these processes involve tension, volume, synchronization, winding speeds, moisture content, product thickness or similar requirements, these controls sense variations quickly and compensate for change through the P.I.V. before product quality is affected.

These unique P.I.V. drives are built in a wide range of sizes and assembly types, in capacities from 1/2 to 25 h.p.

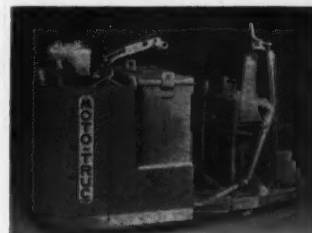
## HANDLING & PACKAGING

**Safe handling permitted in hazardous areas with walkie truck**

Switches, motors, junctions sealed in special enclosure

Uses: For moving materials in hazardous locations.

Features: Units can be used for mechanized handling



Walkie truck is safe for mechanized handling in hazardous areas

without danger of explosion in hazardous areas.

**Description:** Electric powered "walkie" type industrial truck has all electrical switches, motors and junctions sealed in specially designed enclosures. Wire is contained in armored conduit.

To eliminate hazards and heat of resistance boxes normally used on this type of truck, a unique battery arrangement is used to permit flexible speed control. Battery itself is completely sealed to avoid possibility of sparks caused by accidental grounding of connection.

(Explosion-proof walkie trucks are product of Moto-Truc Co., 1954 E. 59th St., Cleveland 3, Ohio.)

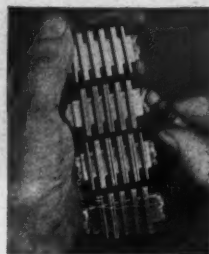
Check 2926 opposite last page.

**Final accuracies of 0.1% by batching scale are reported**

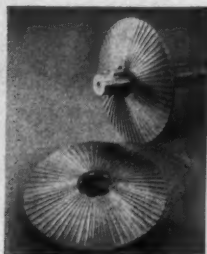
Electronic control system has no mechanical parts

Uses: For controlling feed rates of wet or dry material.

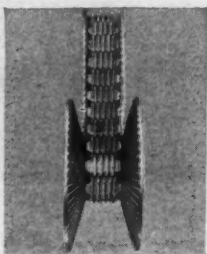
Features: Accuracies of 0.1% are claimed for wet or dry material being fed at rates from five lb to five tons per hour. Electronic closed-circuit control system has no me-



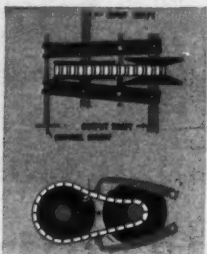
Self tooth-forming chain consists of overlapping steel laminations serving as teeth.



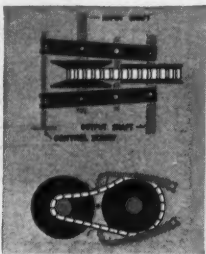
Teeth on radially grooved wheels provide grip for self tooth-forming chain.



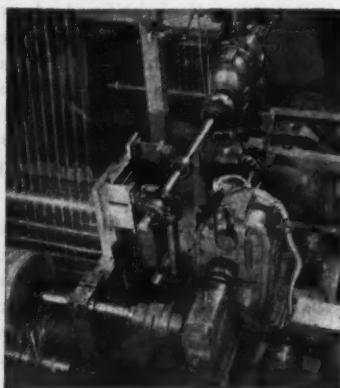
Chain teeth engage wheels to provide a positive chain drive to transmit power.



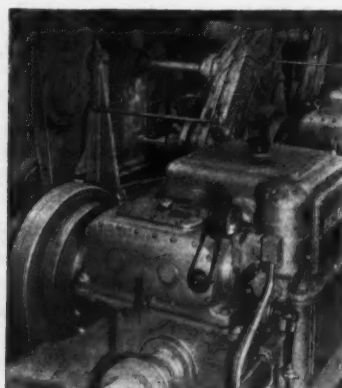
Maximum speed setting of the grooved wheels produces high speed at output shaft.



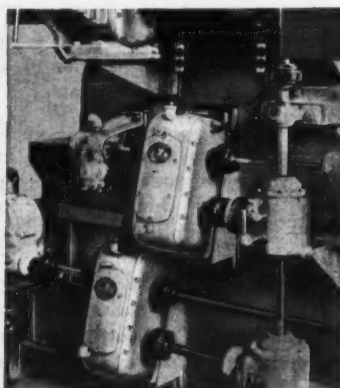
Minimum speed setting of the grooved wheels produces low speed at P.I.V. output shaft.



**PRINTING**—P.I.V.'s on windup and dryer rolls prevent tension build-up on press running cellophane sheet.



**PAPER MAKING**—P.I.V. with remote control lets operator control draw on differential drive paper machine.



**TEXTILES**—P.I.V.'s on rayon spinning machine control thread denier and speed of viscose metering pumps.

**BOOKS 2274 and 2349** describe P.I.V. drives and controls, respectively. Get your copies from your nearby Link-Belt office or authorized stock-carrying distributor.

**LINK-BELT COMPANY:** Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Sales Offices, Stock Carrying Factory Branch Stores and Distributors in All Principal Cities. Export Office: New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville (Sydney), N.S.W.; South Africa, Springs. Representatives Throughout the World. 14,310

Check 2925 opposite last page



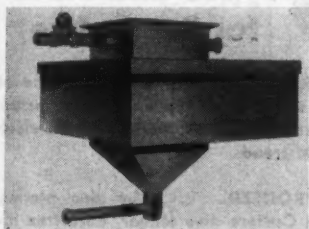
## HANDLING & PACKAGING

chanical parts subject to wear.

**Description:** Operation of constant high-feed batching scale utilizing electronic closed circuit control is as follows: Material hopper is supported by scale. Scale orders periodic filling of hopper as needed. Serving a multiple purpose, scale is automatically brought to zero error (or balanced condition) by servomotor positioning a poise on balance beam. Poise is retracted at constant preset rate by velocity servo system.

Rotary feeder discharges hopper at rate dependent on withdrawal rate of poise, or pounds per hour. To maintain scale in balance, weight sensing element detects unbalance and controls speed of rotary feeder.

This closed-loop system will maintain constant speed control over a long period of time



Constant-speed batching scale with closed-loop system will maintain speed control over long period of time since accuracy is not dependent on wearing parts

as the accuracy is not dependent on wearing parts. Weight register constantly indicates weight of material in hopper.

Feeders are available to handle viscous or lumpy materials. By substituting controlled-orifice valve for dry feeder, liquids can be weighed.

("Low-A-Trol" constant-feed batching scale is product of Thayer Scale Corp., Thayer Park, Pembroke, Mass.)

Check 2927 opposite last page.

Screw conveyor drives are detailed in eight-page bulletin that contains dimensions and specifications and explains method for drive size selection. Bul A667B — Dodge Mfg. Corp., Mishawaka, Ind.

Check 2928 opposite last page.



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A complete, experienced "Background" in quality controlled printing guarantees clean, accurate reproduction of trademarks and company identification for every Raymond Multiwall customer. Creative developments such as Raymond Background Printing give added sales impact. Check the important advantages of Raymond "Background" printing with your Raymond Representative. He'll be glad to show you how they can work for you.

**Special Problem?** New multiwall developments may be the answer. Write Raymond Bag Corporation, Research & Development Division, Middletown, Ohio.



**Raymond**

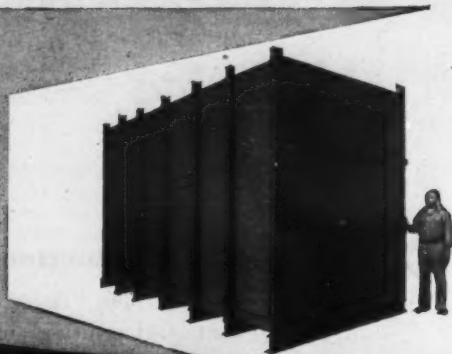
**BAG CORPORATION**

A division of Albemarle Paper Mfg. Co.  
MIDDLETOWN, OHIO • RICHMOND, VA.

Check 2929 opposite last page

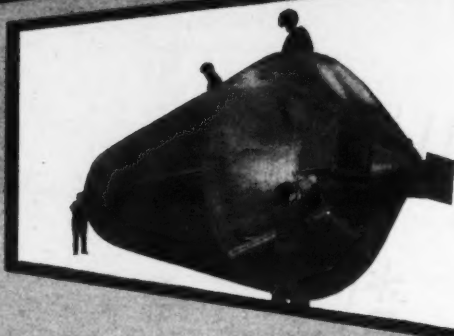


# BINS



# TANKS

# HOPPERS



• for storage or process • lined or unlined  
Whether the tanks, bins and hoppers you need are tiny or titanic . . . Kirk & Blum has the "know-how" and the facilities to fabricate them to your exact specifications.

Plant facilities will accommodate sheet, plate and structural to 1/2" thicknesses. Overhead crane capacity to 25 tons handles the big jobs easily.

Kirk & Blum craftsmen have more than 50 years experience in mild steel, stainless, aluminum and other alloys.

Be sure to send your prints to Kirk & Blum for prompt quotation.

**KIRK & BLUM**

The Kirk & Blum Manufacturing Co.  
8133 Ferrer Street  
Cincinnati 9, Ohio

50 YEARS OF SERVICE

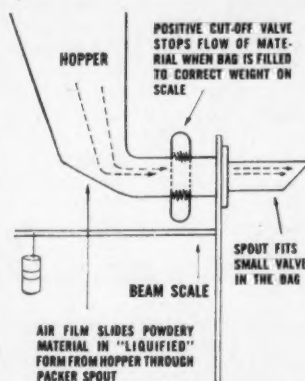
Check 2930 opposite last page

## HANDLING & PACKAGING

**Large, small valve bags filled and weighed cleanly, cheaply**

**Uses:** For filling standard valve bags of from 20 to 100-lb capacity.

**Features:** Since no moving parts are used and no motor is required, filling operations are accomplished without noise or vibration. Bag costs



Proper dispersion of air through air dome feature incorporated in hopper of machine, activates material and causes it to flow through spout where it is discharged into valve bag

are reduced through use of small-diameter spout on machine that fits into small valve opening in bags of minimum size.

**Description:** Valve bag packer is ready to operate when connected with 110-volt AC service and to standard low-capacity air compressor system. Accurate built-in scale provides close weight control and shuts off packer automatically when desired weight is reached.

(Air-Pac valve bag packer is manufactured by E. D. Codding Mfg. Co., 5036 N. 37th St., Milwaukee 9, Wis.)

Check 2931 opposite last page.

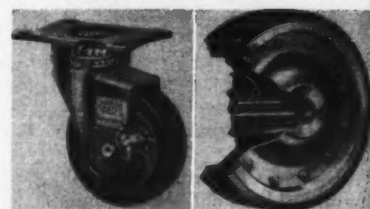
Steel pallet racks for bulky, irregular, fragile, and odd-lot materials are described in six-page illustrated brochure that highlights design, construction, and load-carrying features. Brochure EC-2018 — Republic Steel Corporation, Berger Division, 1038 Belden Ave., N.E., Canton 5, Ohio.

Check 2932 opposite last page.

It makes sense to standardize on

**DARNELL**  
CASTERS AND WHEELS

- Rugged Trouble-Free Performance
- Minimum Maintenance
- Many Extra Years of Service



**Types and Sizes for Every Use**

**RUBBER TREADS . . .** a wide choice of treads suited to all types of floors, including Darnelloprene oil, water and chemical-resistant treads,

**RUST-PROOFED . . .** by zinc plating, Darnell Casters give longer, care-free life

**LUBRICATION . . .** all swivel and wheel bearings are factory packed with a high quality grease that "stands up" under attack by heat and water.

**STRING GUARDS . . .** Even though string and ravelings may wind around the hub, these string guards insure easy rolling at all times.



Write...for this

valuable NEW

FREE MANUAL



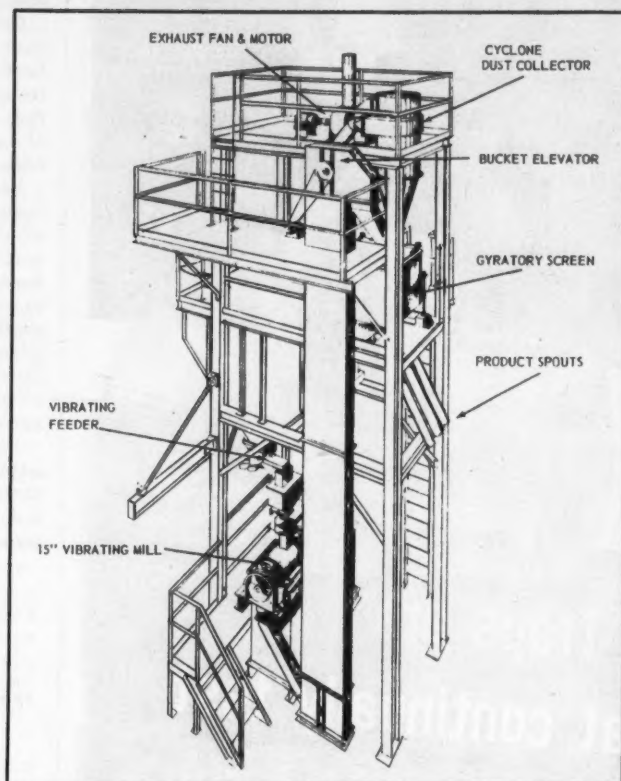
Consult the Yellow Pages

DARNELL CORPORATION LTD.  
DOWNEY (LOS ANGELES COUNTY) CALIFORNIA  
60 WALKER STREET, NEW YORK 13, NEW YORK  
35 NORTH CLINTON STREET, CHICAGO 6, ILLINOIS

Check 2933 opposite last page  
CHEMICAL PROCESSING



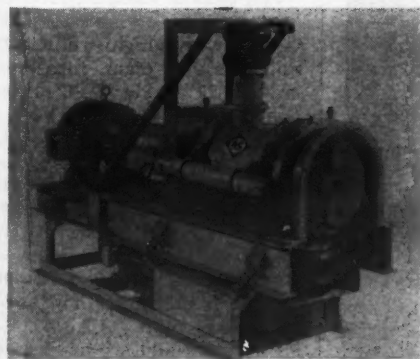
**PROCESSING  
EQUIPMENT**



Overall dimensions of compact grinding plant are 11' wide, 11½' long, 28' high

Low-cost package grinding plant handles variety of materials, can turn out up to one ton product per hour. Complete with auxiliary equipment, installation occupies only 127-sq ft floor area, provides . . .

## Dust-free grinding in small space



Heart of the plant is compact vibrating mill. Operated by 15 hp motor, mill has 40 times greater output than conventional units

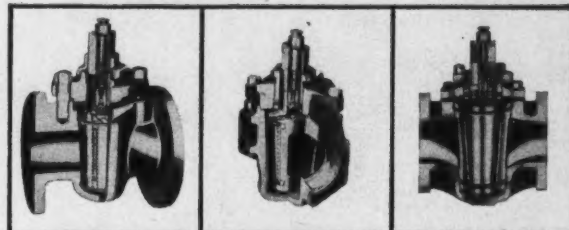
**Uses:** Grinding various dry materials, in 30 to 300 lb per cu ft density range, at processing rates up to one ton per hr.

**Features:** Compact grinding plant is complete package unit requiring less than half the floor space of conventional plants having similar capacity. Pre-engineered around an efficient vibrating mill, plant's initial cost is said to be 25 percent less than that of other grinding installations. Completely aspirated, plant operates essentially dust-free.

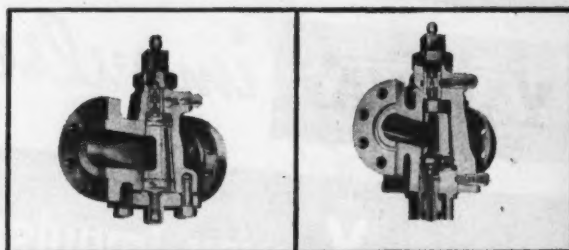
**Description:** Package grinding plant consists of vibrating mill and all necessary auxiliary equipment, including superstructure, vibrating feeder, elevator, gyratory screen, weighing device, and dust collector. Components are conven-

What are your valve needs?  
SPECIFY FROM

## ROCKWELL-NORDSTROM'S COMPLETE VALVE LINE



For working pressures from 175-lb to 800-lb, Rockwell-Nordstrom valves are available in semi-steel and corrosion resisting alloys in sizes from 1" to 24".



For working pressure to 10,000-lb, Rockwell-Nordstrom Hypseal valves are available in steel and corrosion resisting metals in sizes to 30". Operated by wrench, gear or power actuators.



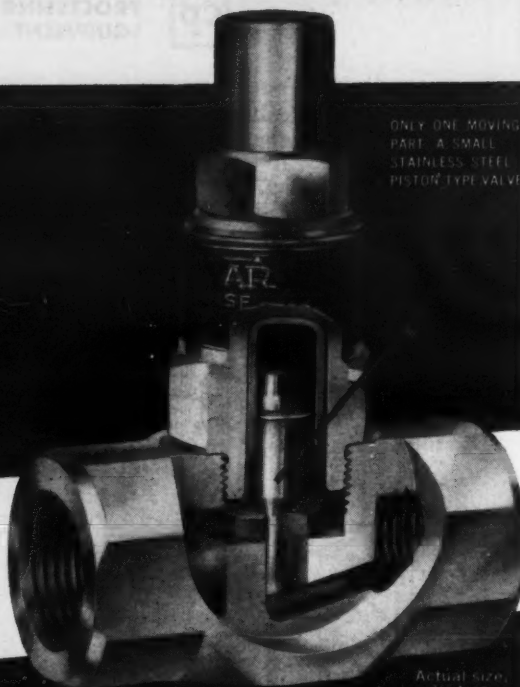
Rockwell-Nordstrom Multiport valves permit three and even four way control with one valve . . . ideal for batching, blending or relief service. See diagrams for a few of the possible flow arrangements.

Rockwell-Nordstrom is the world's most complete line of lubricated plug valves, plug valve lubricants and operating accessories. Whatever your needs, you'll get better flow control at far lower cost when you specify from the Rockwell-Nordstrom line. Rockwell Manufacturing Co., Pittsburgh 8, Pa. Canadian Valve Licensee: Peacock Brothers Limited. Check No. 2934 on the reply slip in this magazine for free details.

ROCKWELL-Nordstrom VALVES

*it's* **ROCKWELL**®  
MANUFACTURING COMPANY

Check 2934 opposite last page



**impulse**

**Yarway Impulse\* Traps are the only steam traps that continually test for condensate in the line ahead of the trap and operate to discharge it as soon as it forms.**

**You gain by higher temperatures, steadier temperatures, peak operation of steam heated equipment at all times.**

\* A COMPLETE LINE OF STEAM TRAPS ALL OPERATING ON A PROVEN THERMODYNAMIC PRINCIPLE

Manufactured by YARNALL WARING CO., 125 Mermaid Avenue, Philadelphia 18, Pa.

Stocked and sold by 270 Industrial Distributors

Write for free bulletin "The Why and How of Steam Trapping"

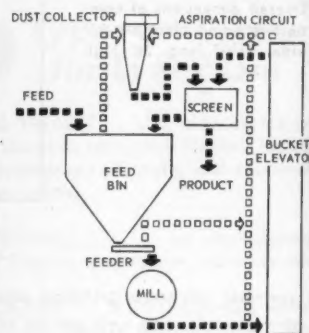
## PROCESSING EQUIPMENT

iently accessible by ladders and walkways.

Occupying only 127-sq ft floor space and relatively low head room, plant can be readily installed in existing buildings. Overall dimensions are 11' wide, 11½' long, and 28' high.

Each component in plant is designed to do only one specific job and no other. For example, the vibrating mill is used only for grinding. It is not used in the classifying operation, which is done by gyratory screen. As a result, each machine operates at top efficiency and imparts peak performance to overall system.

Plant is flexible and can be adjusted to meet various product specification requirements. Mill speed and amplitude are variable. Gyratory



System is completely aspirated, operates essentially dust-free

screen can be set to produce up to six different separations. If exceptional fine grinds are required, a mechanical air separator may be substituted for gyratory screen.

Adjustable vibrating feeder controls rate of feed to mill. Compact and highly efficient, mill has 15" diam, measures only 2' 11" wide, 7' 1" long, and 6' 6¼" high. Mill's volume is less than 1½ cu ft, resulting in considerable economy in grinding media. All wearing parts are replaceable.

Driven by a 15-hp motor, mill is said to have up to 40 times greater grinding output per cu ft capacity, than conventional mills. Unit consists essentially of a spring-mounted cylinder having an enclosed eccentric mechanism running horizontally through

Check 2935 opposite last page



## PROCESSING EQUIPMENT

its center. The protective enclosure for the eccentric shaft acts as springboard for grinding charge.

Grinding media (balls or rods) occupies about 80 percent of mill volume. Grinding charge vibrates at high speed. In operation, entire interior of mill is filled with vigorous grinding action. Balls (or rods) bounce off each other as well as off mill's shell and inner cylinder. Combination of high percent media loading, mass rotation, and multiple impact result in top grinding efficiency.

### Products Ground

Type and size of grinding charge may be varied. Mill has successfully ground such materials as: alumina, asbestos fibers, barite, boron carbide, cement clinker, copper ore, dolomite, glass shot, mica, limestone, high carbon ferrochrome alloys, paint pulp, shale, silicon carbide, urea powder, wood fibers, and zirconium oxide.

(Package grinding plant was developed by Allis-Chalmers Manufacturing Company, Milwaukee 1, Wisconsin.)

Check 2936 opposite last page.

**Vegetable oil extraction** equipment now available is described in useful 12-page catalog. A brief description of Expeller Process is given, together with an explanation of how twin motor principle results in more efficient operation. Capacities, residuals, and shipping weights are itemized for each model. Cat 458 — The V. D. Anderson Company Div., International Basic Economy Corp., 1935 W. 96th St., Cleveland 2, Ohio.

Check 2937 opposite last page.

**Filter medium** — Double layer, sheet metal medium with single pattern of perforations and size of opening is described in 4-page bulletin that outlines various applications. Developed primarily as filter medium for coffee percolators, product was soon discovered to have strength, rigidity, and high retentivity of solid particles that indicated many industrial applications. Bul 582 — Multi-Metal Wire Cloth Company, Inc., 1350 Garrison Avenue, New York 59, New York.

Check 2938 opposite last page.

# BULLETIN 383

**gives you the  
inside story**

on Bufllovak's  
agitated film  
Roto-Vak —

**a new advance  
in high density  
heat transfer**



Bulletin 383 is yours for the asking. Your copy will show you how this new Roto-Vak can handle viscous, foamy or heat sensitive materials with new efficiency, lower cost.

Bulletin 383 points the way to new opportunities as it shows how this Roto-Vak provides high density concentration of a whole range of new materials. Roto-Vak can widen your processing and product horizons. Get your copy today.



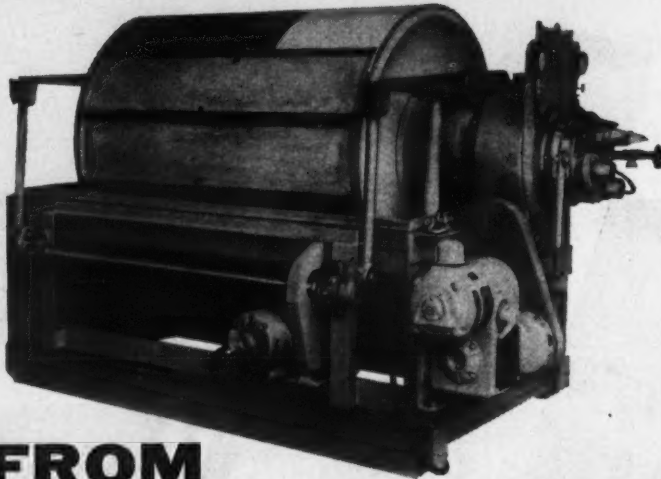
## BLAW-KNOX COMPANY

Bufllovak Equipment Division

1645 Fillmore Avenue • Buffalo 11, New York

Check 2939 opposite last page

# FIRST MOLDED PLASTIC ROTARY FILTER



## FROM DORR-OLIVER

developed for corrosive applications  
cuts cost • reduces scaling problems

NOW—for many corrosive applications which normally require alloy metal or rubber-covered construction—Dorr-Oliver presents a new and revolutionary rotary drum vacuum filter.

It's the first commercially successful filter available with all essential components fabricated of a wide variety of glass reinforced plastics. Plastic selected is dependent entirely upon application.

Plastic construction results in lower cost than rubber-covered or alloy metal machines of comparable size and design. Reduced weight means economies in structural requirements, rigging and transportation. Apart from corrosion-resistance, the plastic surfaces offer special advantages where scaling is a problem, thus cutting maintenance costs. Snap-out rubber drainage grids provide for easy inspection and replacement.

The new Dorr-Oliver plastic filter has already been thoroughly tested handling acid leach solutions in a large uranium mill. It is backed by the long experience of Dorr-Oliver in building all types of filters. Models are available with filtering areas from 9 to 100 sq. ft. and 3-ft. and 4-ft. diam. drums with faces from 1 to 8 ft. For more information, write to Dorr-Oliver Incorporated, Stamford, Connecticut.



Check 2940 opposite last page

### PROCESSING EQUIPMENT

*Mixer occupies 7 sq ft, can process 50,000 cp material easily*

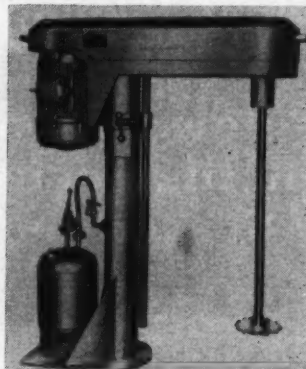
Handles batch sizes from 50 to 200 gal

Uses: Dispersing, dissolving, emulsifying, and deagglomerating solid-liquid, liquid-liquid, or gas-liquid materials of up to 50,000-cp viscosity.

Features: Compact unit occupies only seven sq ft of floor space and can process batches of from 50 to 200 gal at high speeds.

Description: Shaft speeds of 890, 1135, 1509, 1750, and 2040 rpm are quickly attained by use of interchangeable sheaves on V-belt drive. Different impellers are available for maximum performance on various materials.

While in operation, mixing assembly can be raised by hydraulic lift. Minimum height is 69½ inches. Maximum is



Unit is equipped with hydraulic lift for raising mixing assembly

111½ inches. Impeller will center in tank up to 48 inches in diam.

To broaden applications, unit can be equipped with either 7½, 10, or 15 hp motor. Bridge is constructed to swing in 180° arc and may be locked in any lateral position or height.

Equipment is ruggedly constructed, and without motor, weighs approximately 700 pounds.

(Model 510-VH dissolvers are product of Morehouse-Cowles, Inc., 1150 San Fernando Road, Los Angeles 65, California.)

Check 2941 opposite last page.

**MULTIPLE BATCH**

**GRINDING**

**WITH VERSATILE**

**abbe**

**JAR ROLLING  
MACHINES**



Style M, Two-Tier machine, with two rollers per tier, mounted on built-in storage cabinet.

Multiple batches of similar or different materials can be economically ground, pulverized or mixed simultaneously on a versatile Abbé Jar Rolling Machine.

Jars, bottles or containers of different sizes can be used at one time. Each jar can be removed after its full grinding or mixing cycle has been completed—without stopping the machine.

Modern, rugged Abbé Jar Rolling Machines are available to handle single or parallel rows of jars, and in double or triple tiers for processing as many jars as required. Standard porcelain or steel jars range in size from 1 quart to 6 gallons. Built-in storage cabinets on tiered machines are optional.

Write for NEW  
Abbé Jar Rolling  
Machine Catalog 79

Address Dept. 46

**abbe ENGINEERING CO.**

420 Lexington Ave., New York 17, N.Y.

Designers and Manufacturers of  
Ball, Pebble and Jar Mills • Pulverizers  
Sifters • Cutters • Mixers

Check 2942 opposite last page

CHEMICAL PROCESSING



## THAT'S INTERESTING

### Look Mom! The cake's in orbit!

U.S. space biologists suggest that yeast culture might be used as substitute for animals — such as dogs — in satellite research. Measurement of orbiting yeast's carbon-dioxide output, telemetered back to earth, would give researchers as much information about radiation effects on living organisms as data from Russia's Laika. (*Industrial Research Newsletter*, Armour Research Foundation)

### B.S. in P.E. degrees

The first plastics engineering degrees ever to be conferred were among those presented to the June '58 graduating class at Lowell Institute of Technology, Lowell, Mass. Eight graduates received the degree of B.S. in P.E. There will be 23 candidates for the degree in the '59 class.

For more information on product at right, specify 2943 see information request blank opposite last page.



Circular sidewall of B&W Insulating Firebrick in an oil heater.



## How B&W Insulating Firebrick cut processing costs

Here are four key reasons why B&W Insulating Firebrick reduce over-all costs in chemical and petroleum process furnaces:

**High Hot Load Strength** — B&W IFB provide maximum load-bearing capacity under operating temperatures. Many oil heaters have been built with walls 80 feet high with no intermediate support.

**Low Heat Storage** — Cost-cutting B&W IFB have the lowest heat storage of any insulating firebrick. Since B&W IFB cool off fast, they protect expensive alloy tubes in the event of forced shut-down...

make possible quick access to the furnace for inspection. They also reach operating temperature quickly, reducing cycle time and fuel bills.

**Long Life** — B&W Insulating Firebrick are long lasting because of the exceptional refractory nature of their base ingredients and the high processing temperatures to which they are subjected during manufacturing.

**Short Installation Time** — You save materially with B&W Insulating Firebrick because they are machined to size. They may be modified to fit door openings, peepholes, and other special conditions because

they can be cut, drilled or shaped on the job with ordinary woodworking tools.

These sound reasons explain why process furnace builders and operators specify B&W Insulating Firebrick. Learn how these lightweight brick can help you save money. Your B&W representative will be glad to give you facts and figures.



### B&W REFRACTORIES PRODUCTS:

B&W Allmul Firebrick • B&W 80 Firebrick • B&W Junior Firebrick  
• B&W Insulating Firebrick • B&W Refractory Castables, Plastics and  
Mortars • B&W Silicon Carbide • B&W Ramming Mixes • B&W Kaowool



## PROCESSING EQUIPMENT

**Dryer has sealed ends,  
can recover solvent  
at vacuum, pressure**

Steam-tube unit can double  
as dryer or reactor

**Uses:** Continuous solvent stripping, drying, heating, cooling, or reacting of various solid materials under vacuum or pressure, or in an inert gas atmosphere.

**Features:** Unit is of the rotating type, having its revolving joints sealed with specially developed sealing devices, thus permitting operation without loss of vacuum or



Rotary steam-tube dryer has sealed ends, doubles as dryer or reactor. Pilot plant unit shown above is equipped with expansion chamber (right) to trap dust in vapors before vapors enter solvent recovery system

pressure. Processed material can be discharged continuously.

**Description:** Known as type-CS reactor-dryer, machine is essentially a conventional steam-tube rotary dryer with its ends sealed. If vapor recovery is desired, vapor outlet must be connected to suitable solvent recovery system. Suitable connections are also available for inert sweep gas introduction.

In the case of gas-solid reactions, unit can be used irrespective of whether reaction is endothermic or exothermic.

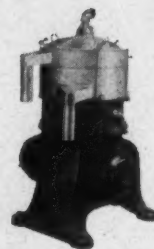
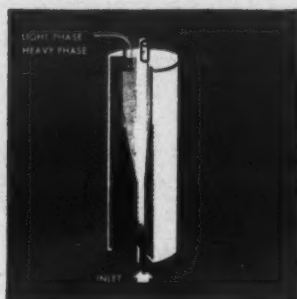
Dryers are recommended for medium vacuum (20" Hg max) applications and pressures up to 15 psi. Units can be constructed of carbon steel, stainless steel, Monel, nickel, or other specified metals. As with conventional steam-tube dryers, maximum cylinder diameter is 10', length as much

# SHARPLES...

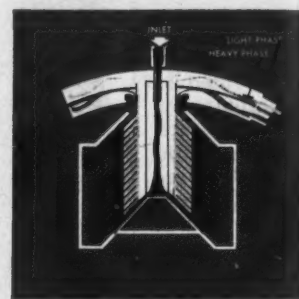
... for SEPARATION of IMMISCIBLE



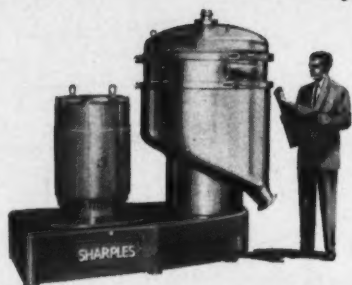
SUPER-CENTRIFUGE



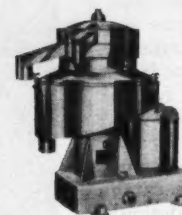
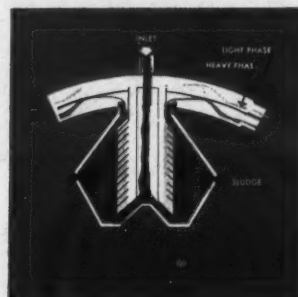
SOLID BOWL CENTRIFUGE



... for CONTINUOUS CONCENTRATION and

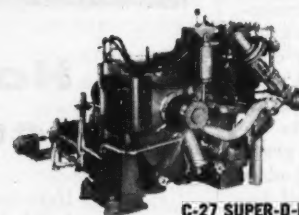
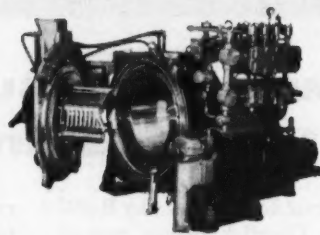
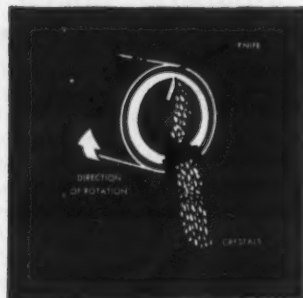


DN-6 HIGH CAPACITY NOZZLEJET



DN-3 NOZZLEJET

... for RECOVERY, WASHING, and DEHYDRATION of CRYSTALS



C-27 SUPER-D-HYDRATOR

With the addition of the C-41, the three sizes of Sharples SUPER-D-HYDRATOR cover the broadest range of capacity—These are completely automatic, horizontal perforate basket centrifuges which operate continuously at full speed for the recovery, washing, and dehydration crystals. Special designs available for pressure operation.

## SHARPLES PROCESSES and PROCESS ENGINEERING

range from complete plants such as complete soap plants, vegetable oil processing plants, tall oil recovery plants, animal fat rendering, treatment of residual oil, to unit operations such as dehydration of numerous types of crystals, desludging, etc. Your problems will be analyzed by experienced process engineers.

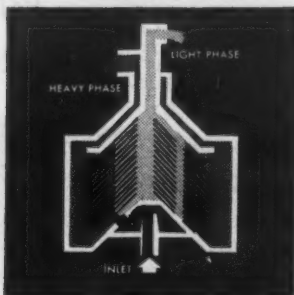
## THE COMPLETELY INTEGRATED LINE OF CONTINUOUS CENTRIFUGES

*High Capacity • High Pressure • Peak Performance*

### LIQUIDS and for CLARIFICATIONS

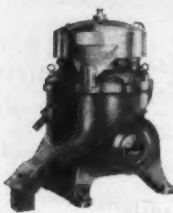
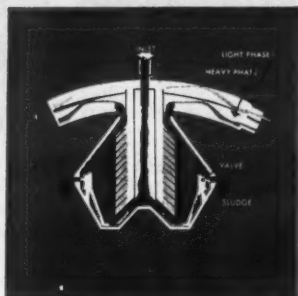


PRESUR-SEALD CENTRIFUGE



A wide choice of centrifuge types, including the Sharples SUPER-CENTRIFUGE, which develops the highest centrifugal force commercially available, 13,200 X G, as well as disc bowl centrifuges, and the Sharples PRESUR-SEALD centrifuge for operation under positive pressure.

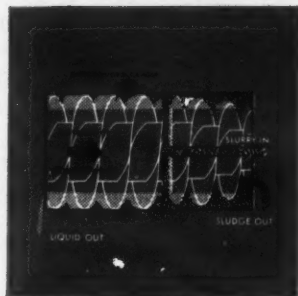
### REMOVAL of SOLIDS from LIQUIDS



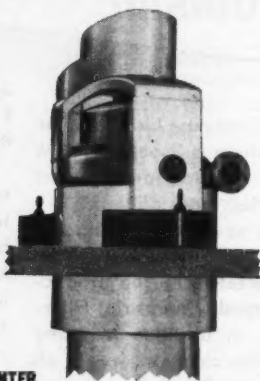
AUTOJECTOR

Sharples offers the widest range of NOZJECTOR and other nozzle type centrifuges available to effect separations, clarifications and solids concentrations of varying complexity. Internal or external control of valves provides intermittent or continuous discharge of concentrated solids; highest capacities with peak performance; pressures to 150 psi.

### ... for CONTINUOUS DEWATERING of SLUDGES and SLURRIES



P-7000 SUPER-D-CANTER



P-3000 SUPER-D-CANTER

Six sizes of Sharples Super-D-Canters for continuous removal of solids from slurries and suspensions; recovery, dewatering, and washing fine crystals and other solids, and wet classification of solids. Complete range of capacities; pressure operation to 150 psi.



### PROCESSING EQUIPMENT

as 110'. Largest Btu capacity is 85 million. Pilot plant size unit is available at manufacturer's laboratory for test runs.

(Louisville type-CS reactor-dryer was developed by Louisville Dryer Division, General American Transportation Corporation, 135 South La Salle Street, Chicago 90, Illinois.)

Check 2945 opposite last page.

### Woven from plastics, filter media support resists corrosion

**Uses:** As filter media support and drainage member for wet process filters.

**Features:** Material is woven from saran and polyethylene fiber. Corrosion resistance is very good. Resistance to (and recovery from) compression is also high.

**Description:** Product's smooth surface, as compared to conventional coarse woven-wire or perforated plate, is said to boost filter media life and eliminate need for under-covers, even with lightest



Honey comb structure provides good flow for filtered liquid

media. Honey comb structure provides excellent flow for filtered liquid.

Other suggested applications for woven product include use as spacer and support for dust collector bags, as mist eliminators or entrainment separators in towers, scrubbers, gas absorbers, evaporators, and similar units.

Material is capable of withstanding moderate temps.

(Trilok fabrics are distributed by The National Filter Media Corporation, 1717 Dixwell Ave., New Haven 14, Conn.)

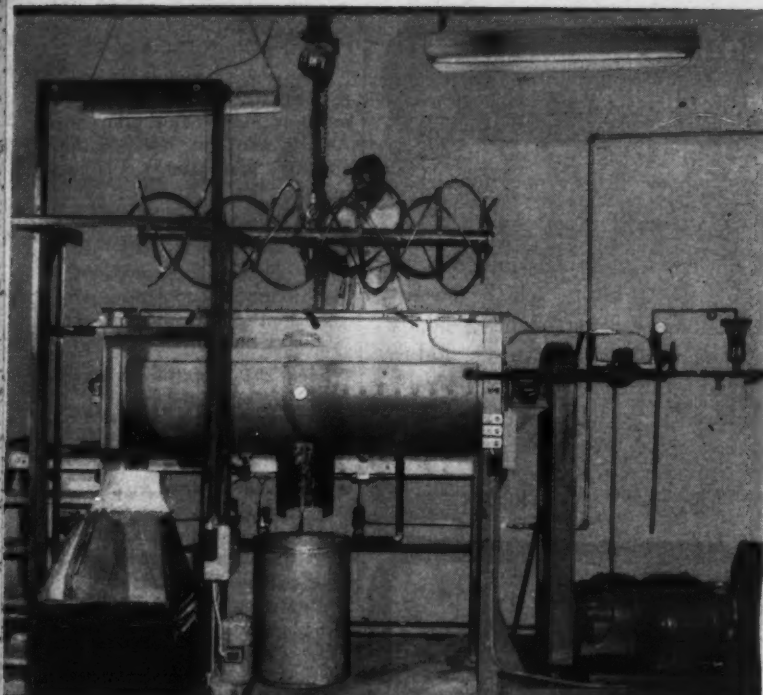
Check 2946 opposite last page.

# SHARPLES

THE SHARPLES CORPORATION

2300 WESTMORELAND STREET • PHILADELPHIA 40, PENNSYLVANIA  
NEW YORK-PITTSBURGH-CLEVELAND-DETROIT-CHICAGO-NEW ORLEANS-SEATTLE-LOS ANGELES-SAN FRANCISCO-HOUSTON-ST. LOUIS-ATLANTA  
Associated Companies and Representatives Throughout the World

Check 2944 opposite last page



**Features of this installation:**

- Easily removable Agitator.
- Easily cleaned inside construction including removable plasticizer pipe.
- Variable Speed Drive.
- Jacketed with automatic switches for quick changes from heating to cooling.
- Thermocouple for Temperature Control.

**PAUL O. ABBÉ** supplies  
the mixer you need  
for the exact job  
you have to do.

No matter what your mixing problem, Paul O. Abbé will supply the mixer you need for the job you have to do. Paul O. Abbé mixers are made to your order from standard components. The Mixer shown above was made for a company which does a large volume of commission compounding. Such custom work calls for frequent changes of color and materials. Good blending action is vital. Thorough and quick cleaning is mandatory to prevent contamination and to assure a minimum of downtime.

"Your mixer gives us thorough blending," says the General Manager of the company.

"Our former blender took two to four times longer to clean than the Paul O. Abbé blender . . . your blender is one of our finest functioning machines."

Why use a stock machine that may lack many features you require, when Paul O. Abbé can supply exactly the mixer you need?

To do a better mixing job, reduce downtime and mixing costs, get all the facts about Paul O. Abbé mixers.

Write today for Catalog V-1.

**PAUL O. ABBÉ**  
GRINDING & MIXING EQUIPMENT  
82 CENTER AVE. LITTLE FALLS, NEW JERSEY

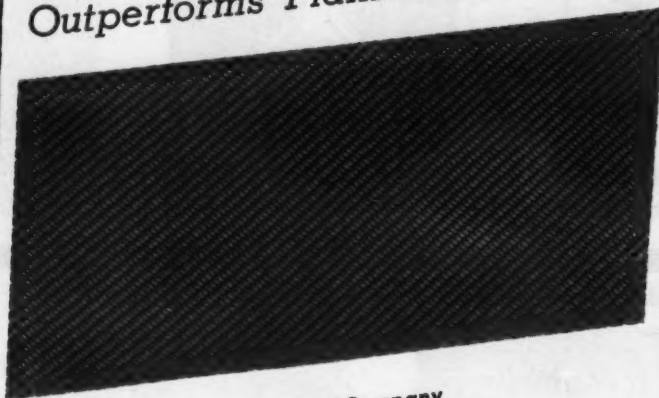
PEBBLE MILLS  
STEEL BALL MILLS  
JAW MILLS  
JAW ROLLING MILLS

MASS & PASTE MIXERS  
RIBBON MIXERS  
NOTA-CONE BLENDERS  
NOTA-CONE VACUUM DRYERS

Check 2947 opposite last page

**DAVISON CHEMICAL COMPANY**  
Division of W. R. Grace & Co.

**CR Treated Cotton Filter Cloth**  
**Outperforms Plain Cotton 2 to 1**



Where: Davison Chemical Company  
Division of W. R. Grace & Co.

Type Filter: 24" 4-eye c.d. Washing Type

Filtering: Thorium Hydroxide Slurry (Density = 1.2)

Cake Characteristic: Slimy

Average Daily Operating Time: 16 hours

Average Life of NFM CR Treated Cotton Cloth: 2 weeks

Average Life of Regular Cotton Cloth: 1 week

This is just one case history out of thousands where a "special" NFM Filter Cloth is outperforming and outlasting other types of cloth.

Over fifty years of weaving experience have given us the "know how" so necessary to the production of top quality Industrial Filtering Fabrics. In addition to many types of cotton cloth, we weave all these synthetic fibers in our own plant: Glass, Nylon, Dacron,††

Saran, Vincel,† Orlon,\* Dynel, Teflon,\*\* Polyethylene and Polymax.†

Write us about your requirements. We'll be glad to send you test samples and to give you the benefit, without obligation, of the knowledge we have accumulated in our many years of servicing the processing field.

\* TM for duPont Acrylic Fiber  
\*\* TM for duPont Tetrafluorethylene Fiber  
† TM-NFM Reg. U. S. Pat. Off.  
†† TM for duPont Polyester Fiber



*Weavers of Industrial Filter Media for over Fifty Years*

**NATIONAL FILTER MEDIA Corporation**

General Offices and Mills: New Haven 14, Conn.  
Western Office and Factory: Salt Lake City 10, Utah

Hudson, Ohio: 227 Hartford Drive  
Los Angeles, Calif.: 416 West 8th St.  
Chicago, Ill.: 6034 N. Cicero Ave.  
Elizabethton, Tenn.: Paul Chapman Assoc., Box 787  
Toronto: Lee Benner Chem., C. P. R. Roadway, 1119 Yonge Street

Mexico City: Maquinaria Minera, Apartado Postal #215  
Cincinnati, Ohio: Roselawn Center Bldg.  
Houston, Texas: 1607 Jefferson Ave.  
Pensacola, Fla.: Chem-Gulp Co., 1102 Texar Drive  
Montreal: Lee Benner Chem., 4700 Prince of Wales

Check 2948 opposite last page

CHEMICAL PROCESSING



## PROCESSING EQUIPMENT

### Free moisture removed from scrubber gases by extractor

**Uses:** Removing free moisture from wet scrubber exhausts.

**Features:** Separator operates by centrifugal action and can be installed on existing stack of any wet gas scrubber. Large size unit can handle exhaust gases at rate of 35,000 cfm.

**Description:** Extractor changes direction of exhaust gas flow from vertical to cyclonic path. Centrifugal action imparted by stationary impeller blades remove free moisture along with some entrained dust or other solid particles. Moisture impinges on inside of outer shell and collects at drain outlet for disposal.

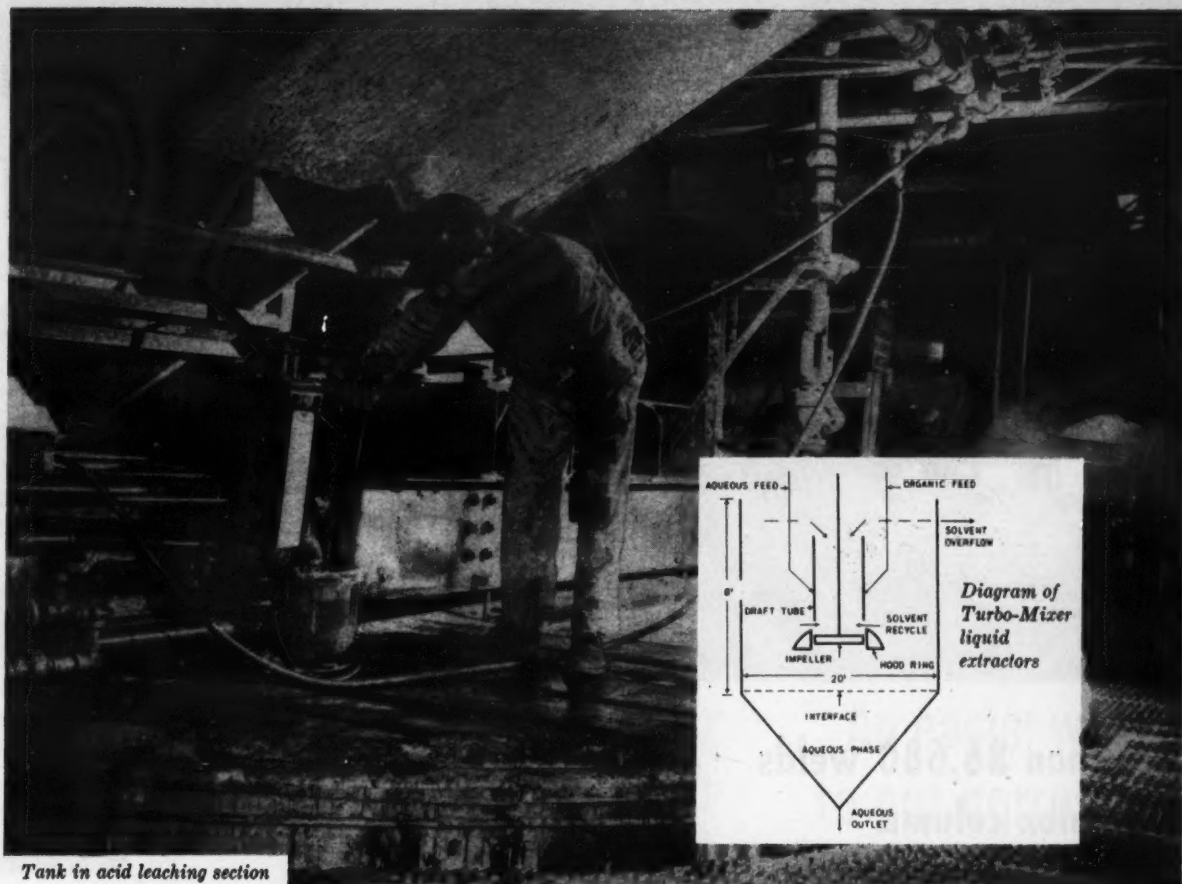
Five sizes of units are available, ranging in dust handling capacity from 10,000 to 35,000 cfm. Cleaning and inspection of the all-welded steel units is facilitated by two water-tight, neoprene-gasketed inspection doors and backwash nozzle at apex of stack. The operator-controlled spray cleans the vanes and flushes stack. Nozzles require 45 gal water per min at 60 psi for cleaning operation.

(Further information about centrifugal moisture extractors may be obtained from The Johnson-March Corp., Philadelphia 3, Pennsylvania.)

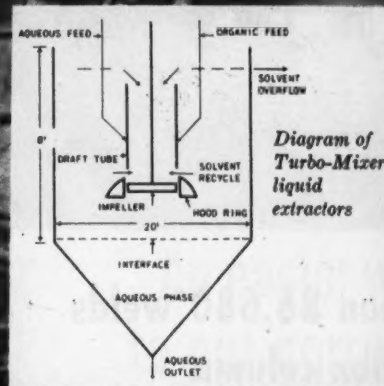
Check 2949 opposite last page.



"Talk about your embarrassing moments..."



Tank in acid leaching section



## VITRO URANIUM HANDLES A WIDE VARIETY OF URANIUM MINERALS WITH TURBO ON THE JOB

When VITRO URANIUM COMPANY of Salt Lake City embarked on a modernization program, they called on GENERAL AMERICAN to assist in the design of the most modern mill possible.

Heart of the plant is the extraction system, and here, GENERAL AMERICAN Turbo-Mixers proved to be key equipment, in both the leaching and liquid extraction sections.

VITRO URANIUM processes a wide variety of uranium minerals which require highly versa-

tile extraction equipment. GENERAL AMERICAN Turbo-Mixers fit this requirement, replacing an outmoded phosphate precipitation operation. Recoveries of uranium fed into the system are "excellent."

As a result of VITRO's million and a half dollar modernization program, the 660 ton/day mill already has significantly reduced operating costs. Further proof that in processing as in transportation and storage, it pays to plan with GENERAL AMERICAN.

FOR DETAILED INFORMATION AND USEFUL DESIGN DATA, SEND FOR THE FOLLOWING BULLETINS:

Please send me the following Turbo-Mixer Bulletin (s):

General Turbo-Mixer Bulletin\_\_\_\_\_

RDC Extraction Column Bulletin\_\_\_\_\_

Side Entering Propeller Mixer Bulletin\_\_\_\_\_

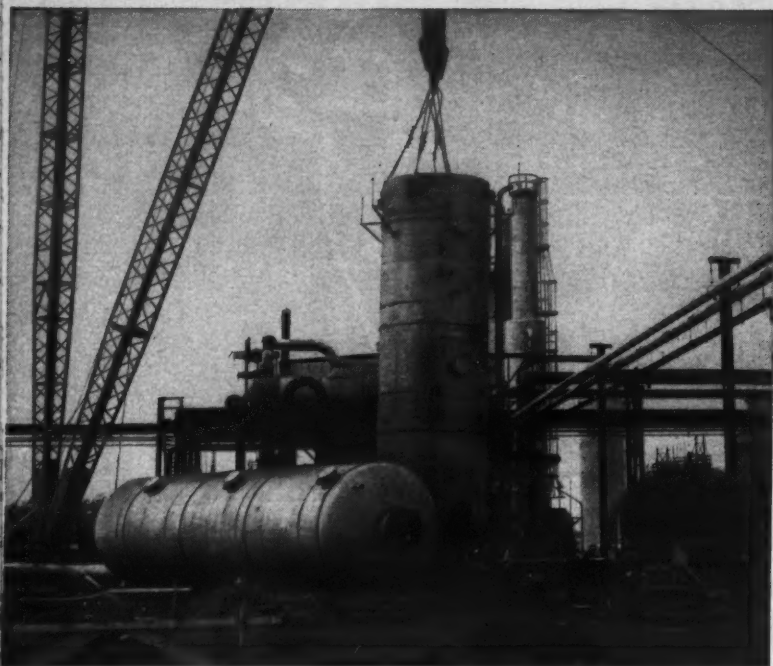
Absorption & Oxidation Bulletins\_\_\_\_\_

**TURBO-MIXER DIVISION**  
**GENERAL AMERICAN**  
**TRANSPORTATION**  
**CORPORATION**

Sales offices: 380 Madison Avenue, New York 17, New York • General Offices: 135 South LaSalle Street, Chicago 90, Illinois • Offices in principal cities



Check 2950 opposite last page



## More than 86,680 welds in complex column by Downingtown

**Diameter:** 11' 11" I.D.

**Total Height:** 93' 11".

**Material:** Stainless steel, Type 304. Carbon steel skirt and base ring.

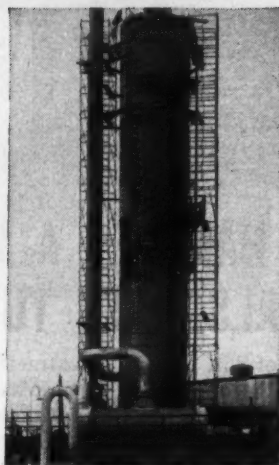
**Shell Thickness:** 1/2" and 3/8".

**40 Trays** and downcomers. 177 bubble caps and risers on each tray.

**Code Stamping:** National Board and ASME. Sandblasted and pickle washed.

Downingtown welders completed more than 86,680 separate stainless steel welds during fabrication of this stainless steel column. Tolerances of  $\pm 1/8"$  ...  $\pm 1/16"$  ... even  $\pm 1/32"$  ... were maintained in the shaping, positioning and welding of thousands of stainless steel parts. Lapsed time from drawing board to final field testing: less than six months.

Send for Bulletin PF. It tells the story of Downingtown skill and experience that enable us to breeze through complex fabrication jobs like this one.



Field tested by Downingtown... inspected by customer and Hartford... Code stamped on location.



Special jig for welding stainless steel risers to stainless steel tray.

## Downingtown Iron Works, Inc.

144 Wallace Ave., Downingtown, Pennsylvania

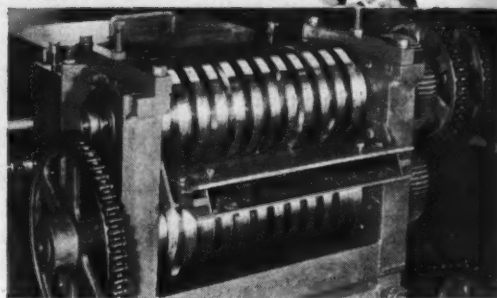
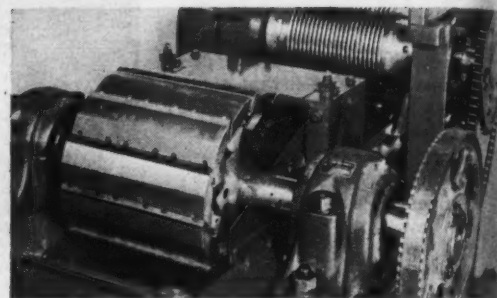
division of **PRESSED STEEL TANK COMPANY** Milwaukee  
Branch offices in principal cities

**HEAT EXCHANGERS—STEEL AND ALLOY PLATE FABRICATION**  
**CONTAINERS AND PRESSURE VESSELS FOR GASES, LIQUIDS AND SOLIDS**



Check 2951 opposite last page

# TAYLOR-STILES PELLETIZERS



## Standard for cutting PLASTIC & RUBBER PELLETS

Taylor, Stiles Pelletizers are fast becoming standard for pelletizing PVC, Polyethylene, Polystyrene, nylon, and other plastics and rubber, in sheet form.

The pellets are uniform in size, have clean edges, and are produced without longs, feathers, or dust.

Production rates are excellent — up to 10 tons an hour for our 700 Series Pelletizers.

Power costs are extremely low because of our shear-cutting principle and the general construction of our machines.

Due to the design of our knives, and the materials used in their construction, sharpening is infrequent and sharpening costs are held to a very low minimum.

For complete details of our Pelletizers, write today for our folders 210, 213 describing and illustrating our plastic pelletizers and 202 giving similar data regarding our rubber pelletizers.

## TAYLOR, STILES & CO.

20 BRIDGE STREET

RIEGELSVILLE, NEW JERSEY

Check 2952 opposite last page

CHEMICAL PROCESSING



do you  
screen or  
size dry  
chemicals?

laboratory  
pilot plant  
production



Get bonus performance  
with the  
**BAR-NUN SIFTER**

Do you need to grade a material by particle size . . . screen out oversize and undersize particles . . . remove lumps or foreign materials . . . or make any type of particle-size separation? Then you want these Bar-Nun Rotary Sifter advantages:

- Accurate separations in large volume, produced in limited floor space.
- Screens totally enclosed by dust-tight, all-metal box. Optional stainless steel construction.
- Easy cleaning. Flip-action clamps permit quick opening of box, and easy removal of screens for thorough cleaning.
- Smooth, low cost operation. Exclusive, all-mechanical design and rugged construction give trouble-free performance even in continuous service on "hard-to-sift" materials.

For single or multiple separations, as fine as 325 mesh—in laboratory work or big volume, heavy duty production—you'll get bonus performance from a Bar-Nun Rotary Sifter. Users' repeat orders prove it. Write for specific details and recommendations without obligation.

**SEND FOR 6-PAGE BULLETIN 503**

For details on other Gump processing equipment, refer to your copy of Chemical Engineering Catalog.



FEEDING • MIXING • SIFTING • WEIGHING • PACKING  
EQUIPMENT FOR THE PROCESS INDUSTRIES

**B. F. GUMP Co.**

Engineers & Manufacturers Since 1872

1344 S. Cicero Avenue • Chicago 50, Illinois

Check 2953 opposite last page

DECEMBER 1958

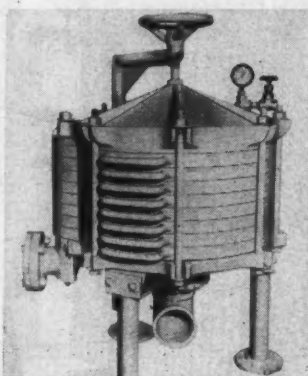
## PROCESSING EQUIPMENT

### Pressure tank eliminated on horizontal plate filter

Results in labor savings,  
lower initial cost

**Uses:** Filtering various materials in chemical and allied industries.

**Features:** Filter does not have a pressure tank. Plates serve as filter unit within



Horizontal plate filter has no tank, operates at pressures up to 150 psi

themselves, can withstand 150 psi without leakage through sealing edges.

**Description:** Filter requires minimum amount of floor space and is available in various materials of construction, including mild steel, stainless, or aluminum in capacities up to 396 sq ft filtering area.

By eliminating pressure tank, considerable labor savings are realized in assembling and disassembling the filter. Initial cost is also reduced. In operation, there is no unfiltered heel at end of cycle. Cake can quickly be blown dry by means of gas or air pressure.

(Model TL tankless horizontal plate filter is product of Sparkler Manufacturing Co., Mundelein, Illinois.)

Check 2954 opposite last page.

For more information on developments reported in this section, check corresponding numbers on Reader Service Slip opposite last page of this issue.

## Life in these excited states...



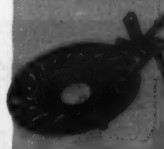
**ACE-ITE**  
all-purpose toughie



High-impact, rubber-plastic, most economical for average chemicals. 1/2 to 6". Screw or solvent welded fittings. Valves 1/2 to 2". NSF-approved. Bul. 80A.

**ODO SHAPES?**

you make...we find



Rubber or plastic lining is economical life insurance for costly "special" equipment. It's a specialty with ACE. Write for Bul. CE-53.

**PLASTIC VALVES**  
for matched systems



Choice of Rivclor PVC, Ace-It rubber-plastic, Ace polyethylene or Ace Saran to match any plastic pipe. Sizes 1/2 to 2". Also larger plastic-lined valves.



Ace-Hide, tough as a rhinoceros, insensitive to corrosives, makes this finest of acid pails. Also dippers, bottles, funnels, etc.

## An easier way to put corrosion under your thumb

Specify the equipment that's engineered to stay on the job under the toughest corrosive service . . . Ace equipment by American Hard Rubber Company. Now nine kinds of plastic and rubber pipe, plus pumps, valves, tanks, and special equipment to solve any corrosion or contamination problem.



processing equipment of rubber and plastics

**AMERICAN HARD RUBBER COMPANY**  
DIVISION OF AMERACE CORPORATION  
Ace Road • Butler, New Jersey

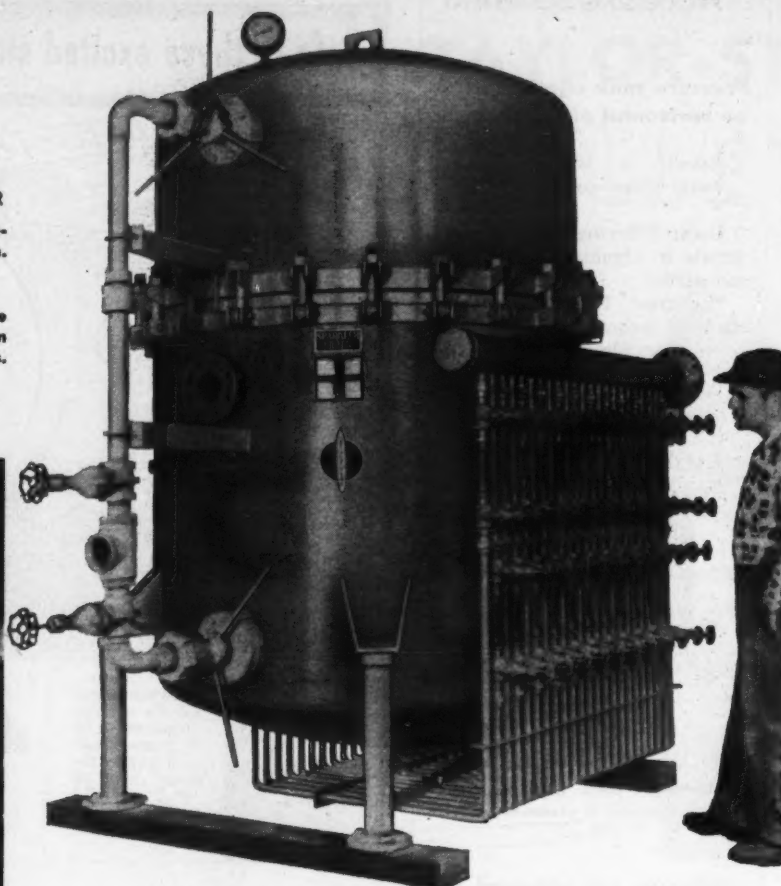
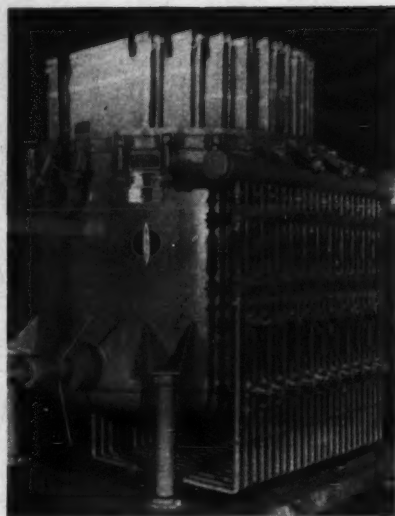
Check 2955 opposite last page



#### SPARKLER MODEL VF FILTER

All Monel metal filter elements designed for filtering caustic solution. 850 sq. ft. of filtering surface.

Custom engineered for performance in areas with restricted headroom and other plant space limitations.



## Another SPARKLER VERTICAL PLATE FILTER

*Designed for service in one of America's largest chemical plants*

Individual plate outlet control valves, sight glasses and sample cocks. Any plate may be cut out of service without interrupting filtering cycle.

This filter is particularly suited for toxic and volatile products. Sealed tank is maintained throughout cleaning and filtering cycles. Available in capacities from 100 sq. ft. to 1000 sq. ft.

Exclusive new vertical plate design. Rigid and non-collapsible plates, with unrestricted high flow center construction.

Spent cake is easily removed without opening filter with the exclusive Sparkler spray sluicing system.

You can depend on Sparkler for the latest developments in modern filtration engineering.

**SPARKLER  
FILTERS**

**SPARKLER MANUFACTURING CO.  
MUNDELEIN, ILLINOIS U. S. A.**

Sparkler International Ltd., Manufacturing Plants at Leliegat 9,  
Amsterdam, Holland; Toronto, Ontario, Canada; Italy and Australia.

FILTRATION ENGINEERING AND MANUFACTURING EXCLUSIVELY FOR OVER 30 YEARS.

Check 2956 opposite last page

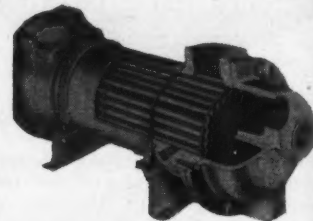
#### PROCESSING EQUIPMENT

**Efficiency up 10-15%  
on heat exchangers  
with improved design**

Uses: Heating and cooling various liquids in chemical and allied industries.

Features: By-pass baffle prevents tube bundle fluid by-pass, boosts efficiency 10 to 15 percent. Mounting brackets for unit are detachable and rotatable 360° for wide applications.

Description: Improved design shell-and-tube heat exchangers are available in sizes ranging from 1.3 to 200 sq ft heat transfer surface. Tubes are spaced on optimum tri-



Units are available in sizes ranging from 1.3 to 200 sq ft surface

angular pitch resulting in maximum heat transfer for minimum pressure drop.

Shell connections are recessed on under side, decreasing entrance and exit losses and preventing bundle erosion. Simple, low cost, and ruggedly built, units are available in single, two, and four-pass models, built of various materials of construction.

The shell has working pressure of 250 psi and the tube, 150 psi. Shell and tube have working temperature of 350°F.

(Perfexchangers are product of Perfex Corporation, 500 W. Oklahoma Ave., Milwaukee 7, Wisconsin.)

Check 2957 opposite last page.

Single-disc aspirator, 21", air-operated, designed for removing light impurities without losing any of the desired class or size, is detailed in two-page bulletin. Engineering diagram gives over-all dimensions and table shows capacity, disc speed, shipping weights. Bul 3-A — Sprout, Waldron & Co., Inc., 130 Logan St., Muncy, Pa.

Check 2958 opposite last page.

## THAT'S INTERESTING

### These records really buried

National Storage Company's record depositor, located about 55 miles from Pittsburgh, is a former limestone mine carved out of solid rock, 220 ft below surface. Big trailer trucks can drive right into the cavern. Guards are on duty 24 hours a day, and center is equipped with modern communications. (B-K News, Blaw-Knox Co.)

### Buggin' the bugs

New addition to antibiotic list is claimed to be effective on germs resistant to older "wonder drugs". Having the generic name *kanamycin*, drug has been under test by more than 50 clinical investigators for almost a year. It has been found to be effective in treatment of certain types of pneumonia, kidney and bladder infections, and infections of blood stream, heart, bones, and soft tissues.

For more information on product at right, specify 2959 see information request blank opposite last page.

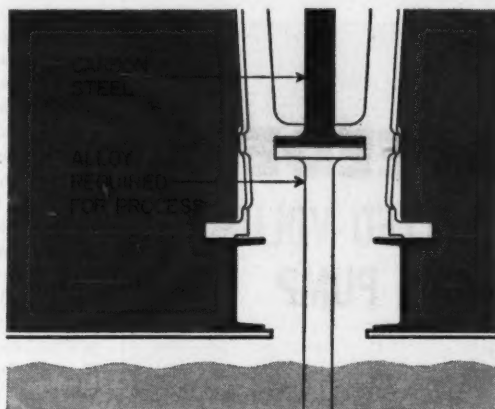
## If you want to cut fluid mixing costs look inside the tank

You can make some of your biggest cost reductions *inside* the tank, when you select a mechanical mixer for fluids.

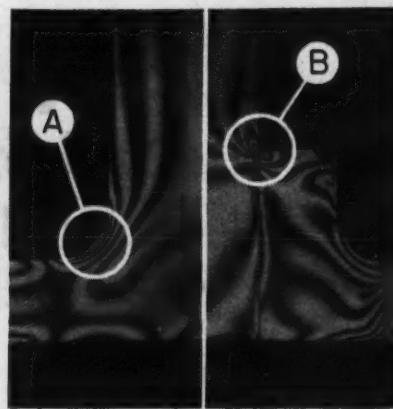
These are *long-term* savings—based on low-cost maintenance, trouble-free service, adaptability to changes in your process, minimum spare-part requirements.

These are the areas where you can *really* save money on fluid mixing. And here are some in-the-tank reasons why you can do it better with LIGHTNIN Mixers than with any other make. For lowest-cost fluid mixing, see your LIGHTNIN representative soon. He's listed in Chemical Engineering Catalog. Or write us direct.

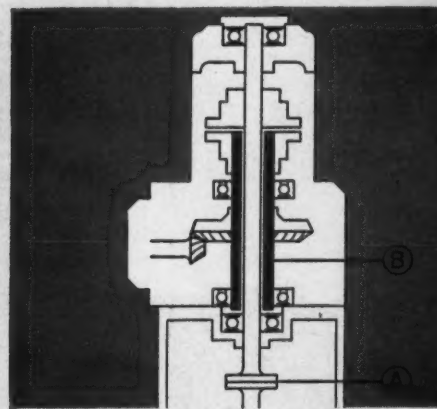
### Save 6 ways with these *Lightnin* shaft and impeller refinements



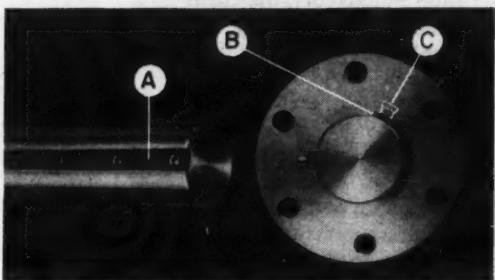
1. Get lower-cost installation, upkeep with two-piece shaft. Standard on open-tank units (available with closed-tank units, too), lower section is alloy required for process; upper section can be inexpensive carbon steel. Rigid coupling has rabbeted joint assuring accurate alignment.



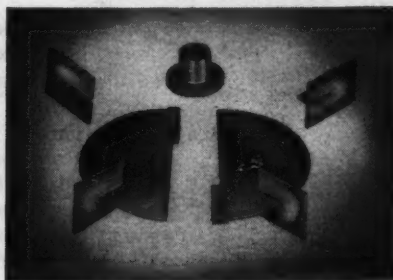
2. You get twice the strength of conventional shaft couplings with LIGHTNIN deep-welded coupling (A). Not one of these couplings has ever failed in service. Polarized light shows how machined and polished radius eliminates stress concentration found in conventional coupling (B).



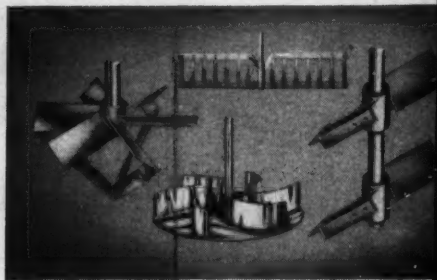
3. No need to disturb gearing if you ever want to replace a LIGHTNIN shaft. Lower shaft is unbolted at (A). Upper shaft slides out of hollow reducer quill\* (B). Gears remain untouched—cannot get out of line. When new shaft is installed, shaft alignment is automatic. \*Patented



4. Save time positioning impellers. Standard 18-inch shaft keyway (A) provides seven positions (more if you want)—saves you cost of special machining. Also note shallow extra keyway (B) for impeller hub setscrew (C). It permits impeller to slide freely, even if shaft is burred.



5. Cut impeller replacement cost with LIGHTNIN all-bolted design. Replace blades without buying a whole new impeller. Blades come off to pass small openings; or impeller can be supplied split, as shown. Same disc takes 4, 5, 6, or 8 blades for easy change in power input.



6. Get the right impeller for your needs. You can handle practically any fluid mixing requirement with a standard LIGHTNIN impeller. But for special jobs, you can get LIGHTNIN impellers made to specification in all machinable materials and with widest choice of coverings.

WHAT MIXING OPERATIONS ARE IMPORTANT TO YOU? You'll find a wealth of information on fluid mixing in these helpful bulletins describing LIGHTNIN Mixers:

- ☐ Top or bottom entering; turbine, paddle, and propeller types: 1 to 500 HP (B-102)
- ☐ Top entering; propeller types: 1/4 to 3 HP (B-103)
- ☐ Portable: 1/4 to 3 HP (B-108)
- ☐ Confidential data sheet for figuring your mixer requirements (B-107)
- ☐ Side entering: 1 to 25 HP (B-104)
- ☐ Laboratory and small-batch production types (B-112)
- ☐ Condensed catalog showing all types (B-109)
- ☐ Quick-change rotary mechanical seals for pressure and vacuum mixing (B-111)

## Lightnin<sup>®</sup> Mixers

MIXCO fluid mixing specialists

Check, clip and mail with your name, title, company address to:

**MIXING EQUIPMENT Co., Inc., 185-n Mt. Read Blvd., Rochester 3, N.Y.**  
In Canada: Greey Mixing Equipment, Ltd., 100 Miranda Ave., Toronto 19, Ont.





Pays for  
itself  
in Savings!

## Lapp PULSAFEEDER CONTROLLED-VOLUME CHEMICAL PUMP

The moment your new Pulsafeeder is put into operation, you're on the way to real savings... savings that can eventually result in the Pulsafeeder paying for itself.

Lapp Pulsafeeder, the chemical pump with no stuffing box, is a piston-diaphragm pump providing positive displacement by a piston pumping a hydraulic medium working against a diaphragm. The diaphragm isolates the chemical being pumped from the working pump parts... eliminates need of stuffing box or running seal... prevents corrosion. Maintenance costs are reduced to next to nothing—there are practically no repairs or replacement of parts with a Pulsafeeder. You'll save, too, by elimination of product loss due to leakage or contamination. In the long run, Pulsafeeder is the safest, surest and lowest cost controlled-volume chemical pump. To prove our stand, we'll be happy to quote actual maintenance costs taken from recorded case histories.

WRITE FOR BULLETIN 440 with typical applications, flow charts, description and specification of models of various capacities and constructions. Inquiry Data Sheet included from which we can make specific engineering recommendation for your processing requirement. Write Lapp Insulator Co., Inc.,

# Lapp

PROCESS EQUIPMENT DIV., 3504 Poplar St., LeRoy, N. Y.

Check 2960 opposite last page

### PROCESSING EQUIPMENT

**Dewpoints as low as  
-100°F obtained with  
efficient air, gas dryers**

Can handle flow rates up to  
1000 scfm

Uses: Drying air and gases.

Features: Units will yield gases having dewpoints as low as -100°F. Flow rates up to 100 scfm are possible.

Description: Line of dryers are designed for use in existing plant systems at pressures up to 125 psi, or as modular units housing complete blower or compressor system for low pressure applications.

All models have automatic regeneration feature. Units are not damaged by liquid water and may be used for producing extremely dry organic solvents, alcohols, and oils. When incoming gas streams have relative humidity of less than 5%, ratio of adsorption of drying media used in dryers is reported to be ten times more efficient than that of conventional desiccants.

(Further information about Molecular Dryers may be obtained from Advance Industries, Inc., Process Equipment Division, 640 Memorial Drive, Cambridge, Massachusetts.)

Check 2961 opposite last page.

**Fine-pitched spiral design  
efficiently converts liquids  
to uniform sprays**

Uses: For general service in operations where liquids in quantities not over 3 gpm are to be sprayed as fine mists. Nozzles are designed to produce fine, uniformly atomized, hollow-cone sprays.

Features: Nozzles, hexagonal on exterior, have fine-pitched spiral which imparts rotating motion to liquid to create hollow-cone spray. Nozzles are available in bronze and stainless steel, and can be made of corrosion-resistant materials if needed.

Description: Nozzles come in 15 orifice sizes, providing wide range of capacities. One-half inch nozzle, for example, with 6.0 mm orifice operates with water supplied at 60 psig.



## PROCESSING EQUIPMENT

Spray angle is 80°, water capacity is nearly 150 gph. If water is supplied at 130 psig, same nozzle will produce fine, even spray at capacity of 220 gph.

Other nozzles operating at 50 psig supply pressure will pass from 8.5 to 145 gph. When water is supplied at 150 psig, nozzles increase capacities to cover range of 15 to 250 gph. Fine sprays can be produced at pressures down to about 10 psig.

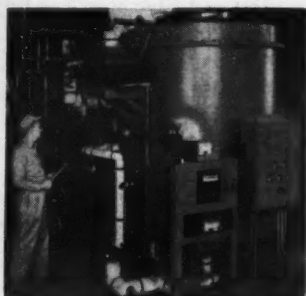
(Fig 661 atomizing nozzles are products of Schutte and Koerting Company, Cornwells Heights, Bucks Co., Pa.)

Check 2962 opposite last page.

### Packaged H<sub>2</sub> generator has automatic controls, safety devices

**Uses:** Producing from 250 to 5000 cu ft per hour of over 99 percent pure hydrogen.

**Features:** Compact gas generator is packaged unit. Ma-



Compact generator can turn out from 250 to 5000 cu ft per hour of hydrogen

chine has push-button safety-purge starting device. Fully automatic controls and proved "fail safe" safety mechanisms are also included.

**Description:** Packaged hydrogen gas generator is mounted on single base and is completely factory tested prior to delivery. All that is required are simple utility connections and unit is ready to operate.

(Packaged hydrogen gas generators are product of Gas Atmospheres, Inc., 20011 W. Lake Road, Cleveland, Ohio.)

Check 2963 opposite last page.

JENKINS

MADE BETTER  
THAN  
NEED  
BE...

## Costs Less to Use

YOU PAY NO MORE for the extra quality you see in every part of a Jenkins Outside Screw & Yoke U-Bolt Gate valve. Yet longer life and reduced maintenance is bound to result from the extra ruggedness, the precision manufacture and unique design features which Jenkins puts into these popular, general utility valves.

Choose the Outside Screw & Yoke pattern for services where spindle threads must be kept out of the destructive effects of fluids in the line; where spindle threads must be cleaned and lubricated regularly or where a rising spindle is needed to indicate wedge position.

Choose JENKINS, whether O.S. & Y. or Inside Screw pattern, for valves built to save maintenance dollars.

**WIDE RANGE OF JENKINS U-BOLT GATES**  
GET FOLDER NO. 207 which describes Inside Screw and O.S. & Y. patterns... Iron Body with Bronze or Stainless Steel Mounting... All-Iron and Ni-Resist with type 316 Stainless Steel trim. Ask your local Jenkins Distributor or write Jenkins Bros., 100 Park Avenue, New York 17.

JENKINS  
LOOK FOR THE JENKINS DIAMOND  
VALVES  
SINCE 1864  
Jenkins Bros.

Sold Through Leading Distributors Everywhere

## O.S.&Y. U-BOLT GATE

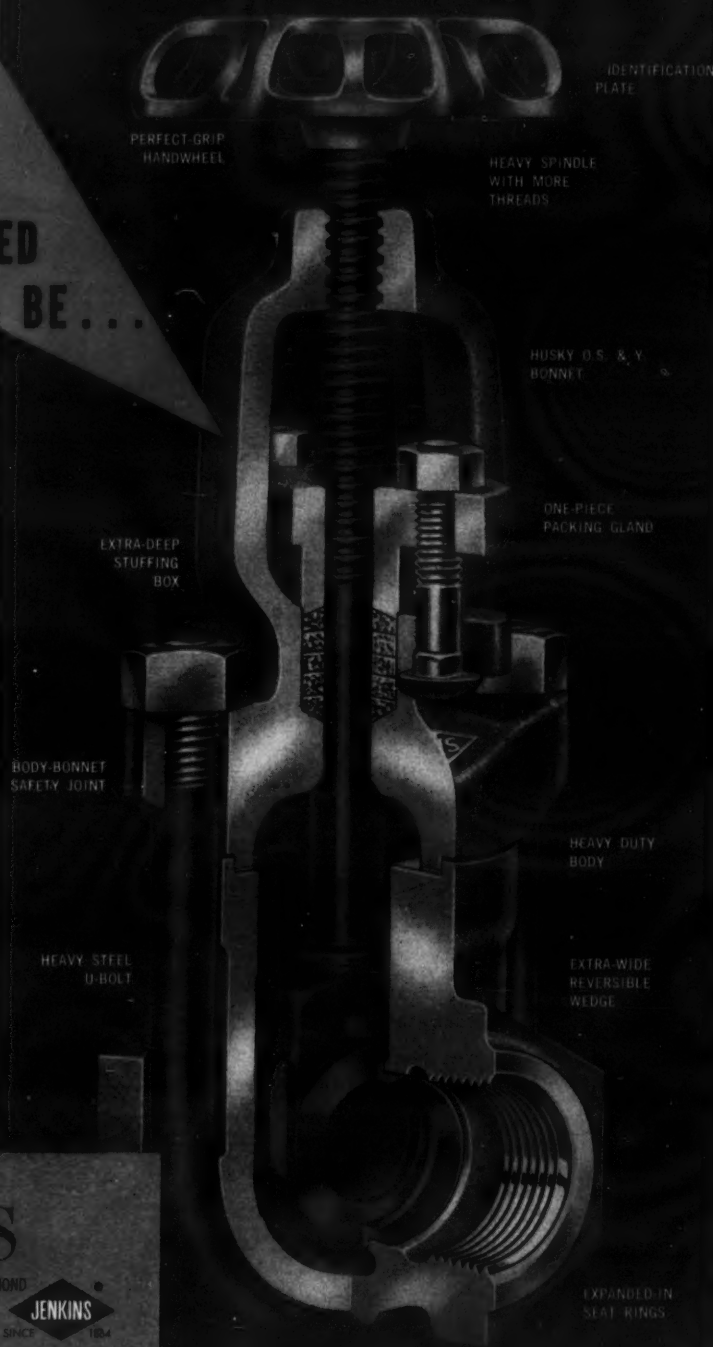
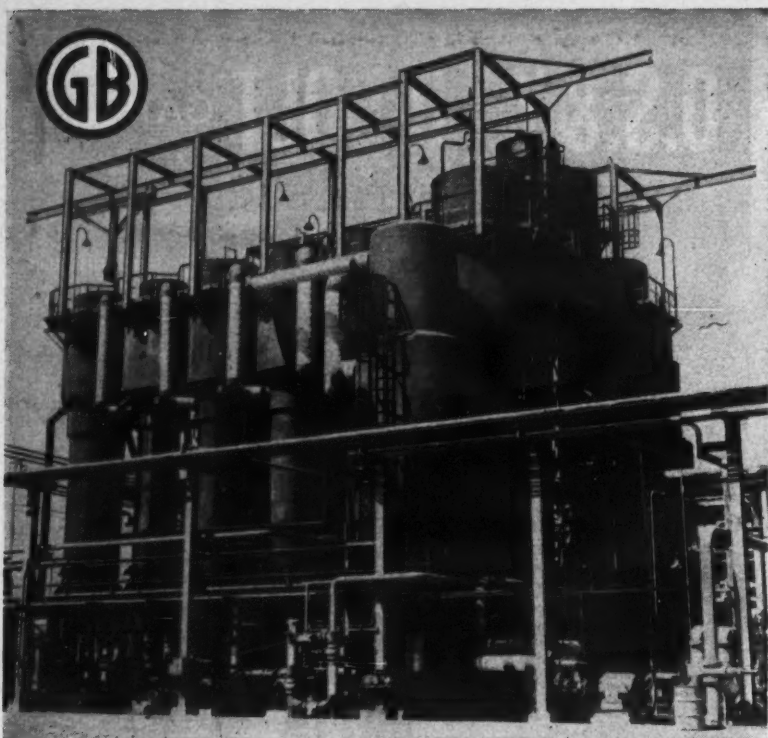


Fig. 242  
Iron Body, Bronze Mounted

Check 2964 opposite last page



## Reynolds Metals Expands with G-B Alumina Liquor Evaporators

Shown here are the original G-B self-supporting, sextuple effect alumina liquor evaporators in use at the Reynolds Metals plant in Corpus Christi, Texas. The fifth and sixth units, offering still greater steam economy with a minimum of fouling will go into use alongside the original units this Fall.

This is typical customer-confidence in G-B designed evaporators. From planning board to installation it will pay you to see G-B first!



**GOSLIN-BIRMINGHAM**  
MANUFACTURING CO., INC.  
BIRMINGHAM, ALABAMA

FILTERS • EVAPORATORS  
PROCESS EQUIPMENT  
CONTRACT MANUFACTURING  
including HEAVY CASTINGS

Check 2965 opposite last page



## PLANT ENGINEERING MAINTENANCE & SAFETY

... electrical & mechanical developments



Photos by CP Staff

Where direct insertion of heaters into vessel or jacket is not practical, external installation (arrow) is used

Trubek Laboratories utilizes diversified equipment and processes to produce an extensive line of aromatic chemicals and intermediates. Provision for a wide range of heating requirements is a must. At Trubek, electric heaters provide ...

**THEODORE W. WETT**, Associate Editor  
with **HERMAN KAPLAN**, Plant Engineer  
Trubek Laboratories, Inc.

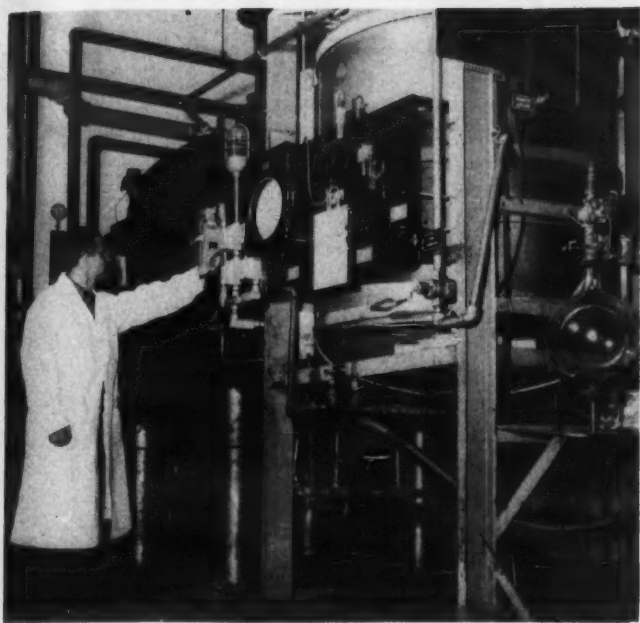
**Problem:** Heating reactors and stills with hot tempering oil was limited in temperature range and troublesome at Trubek Laboratories, Inc., East Rutherford, N. J. Growing diversity of products required a greater degree of flexibility in temperature range than a hot-oil system could provide.

Trubek, in expanding and diversifying equipment used to produce some 400 aromatics for essential oil industry and industrial and pharmaceutical intermediates, often found that temperatures needed were beyond the range of existing heating facilities. In this case, company turned to other

heat transfer media such as Aroclors and Dowtherm.

A central heating system for these new media was considered impractical because of the widely different temperature requirements on the various processing vessels. Individual heating sources were further indicated by physical characteristics of heating media themselves.

**Solution:** With the first Aroclor installation, engineers at Trubek picked Chromalox electric immersion heating units to supply required heat. On 350-gal vacuum still, 18 kw of heating capacity provide operating temperatures up to 290°C. Heaters were



Recently installed 450-gal vessel (rear) has 30 kw of electric heating capacity. Dowtherm A in a sealed jacket is used to obtain temperatures up to 325°C

## High-temperature heating flexibility

placed in bottom of vented vessel jacket containing heat transfer medium.

More recently, 30 kw were installed on a 450-gal reactor. This Dowtherm A-heated ves-

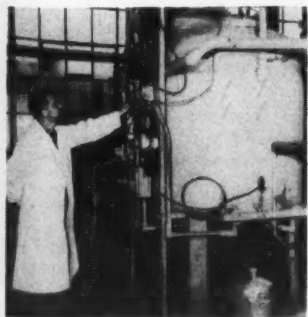
sel has a sealed jacket to permit heating to 325°C.

In some instances, particularly where vessels were equipped with steam coils or for glass-lined equipment, it was not practical to insert heaters directly in vessel or jacket. In these cases, heat transfer medium was heated adjacent to the vessel and circulated by means of a sump-type centrifugal pump.

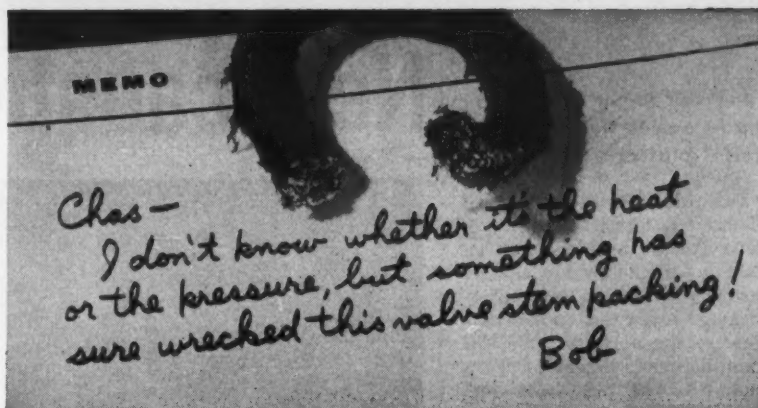
**Results:** Electric heaters have provided versatility needed at Trubek to produce extensive line of aromatic chemicals. Close control of temperature in each vessel is possible.

(Chromalox heaters are supplied by Edwin L. Wiegand Company, 7500 Thomas Blvd., Pittsburgh 8, Pa.)

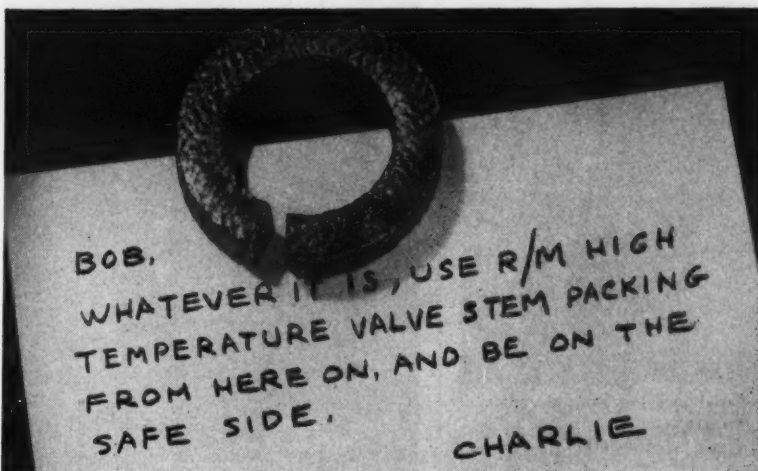
Check 2966 opposite last page.



Temperatures up to 290°C are obtained in this 350-gal still using 18 kw of electric heating capacity to heat Aroclor in vented jacket



Chas -  
I don't know whether it's the heat or the pressure, but something has sure wrecked this valve stem packing!  
Bob



BOB,  
WHATEVER IT IS, USE R/M HIGH TEMPERATURE VALVE STEM PACKING FROM HERE ON, AND BE ON THE SAFE SIDE.  
CHARLIE

R/M's experienced packing engineers designed this line of packings to help you lick the problems caused by higher temperatures and greater pressures in today's processing lines. R/M High Temperature Valve Stem Packings contain practically no organic materials—and it is these organic materials which cause a lot of your trouble by burning and causing volume loss. Lubricants are ground in during manufacture; so they are thoroughly dispersed all through the packing. And braided asbestos yarn provides you with the maximum performance in pressure resistance.

Among the other packing products

engineered by Raybestos-Manhattan to meet difficult requirements are "Teflon"\* and "versi-pak."\* "Teflon" packings, because they show no reaction to any known industrial acids or caustics and are noncontaminating, can be of great help to you in a variety of applications. "versi-pak" is a highly engineered nonjacketed packing offering excellent performance with solvents, weak acids, and caustics over a wide range of conditions. Due to the many applications of both these packings, we suggest that you call on R/M's experienced packing engineers for specific recommendations. Their service is at your disposal.

R/M MAKES A COMPLETE LINE OF MECHANICAL PACKINGS—including Vee-Flex,\* Vee-Square,\* Universal Plastic, and "versi-pak"\*. GASKET MATERIALS; "TEFLON" PRODUCTS. SEE YOUR R/M DISTRIBUTOR.

\*A Du Pont trademark



## PACKINGS

RAYBESTOS-MANHATTAN, INC.  
PACKING DIVISION, PASSAIC, N.J.  
MECHANICAL PACKINGS AND GASKET MATERIALS

RAYBESTOS-MANHATTAN, INC., Mechanical Packings • Asbestos Textiles • Industrial Rubber • Engineered Plastics  
Sintered Metal Products • Abrasive and Diamond Wheels • Rubber Covered Equipment • Brake Linings  
Brake Blocks • Clutch Facings • Industrial Adhesives • Laundry Pads and Covers • Bowling Balls

Check 2967 opposite last page



**Tank and tower care made easier with aerial platform**

Difficult off-the-ground maintenance and repair is done quickly and easily at an East coast chemical plant by utilizing a versatile aerial platform. Known as a Strato-Tower, the unit is used for maintaining and repairing tanks, towers, pipe lines, and other high structures.



Aerial platform eases the maintenance on high, hard-to-reach structures

Platforms, which can reach to 95', position workers in minimum time.

Lines which supply hydraulic oil at 1500 psi, to control valve and actuating cylinders used for boom operation, are fabricated from type 304 stainless steel tubing. Material has successfully withstood corrosive atmosphere found at the plant.

(Strato-Tower is a product of Moore's Time-Saving Equipment, Inc., Elkhart, Ind.)

Check 2968 opposite last page.

(Stainless steel tubing was supplied by Alloy Tube Div., Carpenter Steel Co., Union, New York.)

Check 2969 opposite last page.

Safetee Solvents specification sheets, revised, have been bound in catalogue form for convenient filing. New applications are outlined, in addition to complete specifications for each product. "Safetee Solvents" — Fine Organics, Inc., 211 E. 19th St., New York 3, N. Y.

Check 2970 opposite last page.

# New caustic evaporator shows ho



**VAPOR BODY** for 3-cycle caustic evaporator. All welds involving dissimilar alloy combinations are made with Inco-Weld "A" Wire. Built by Colonial Iron Works, Cleveland, Ohio.

## INCO WELDING P

# how well one filler wire... Inco-Weld "A" wire... joins most dissimilar alloys

This new 3-cycle evaporator produces high-purity caustic — maintains purity with all-Nickel surfaces. It is fabricated of Nickel, Nickel-clad steel, and carbon steel. All welds joining dissimilar alloys are made with Inco-Weld\* "A" Wire.

Finished welds are sound, strong, ductile, and resistant to caustic corrosion. These superior welds are obtained with exceptionally high welding speed by using Inco-Weld "A" Wire and the inert-gas welding process.

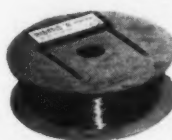
**Add these extras:** (1) easily joins most combinations of dissimilar alloys, (2) no preheat necessary in most cases, (3) X-ray quality welds between 97 per cent of all weldable dissimilar alloy combinations (examples listed in table below), (4) good impact properties at sub-zero temperatures, (5) high stress-rupture properties at elevated temperatures, (6) Inco-Weld "A" Wire deposits can be age-hardened; important where super alloys are to be age-hardened after welding.

Whether you specify Inco-Weld "A" Wire or Inco-Weld "A" Electrode (for field welding and hard-to-get-at joints) you can expect sound welds. Corrosion resistance in most cases equals or betters that of the joined metals.

**Illustrated folder** — "Now You Can Weld Dissimilar Alloys," shows where and how Inco-Weld "A" Wire and Electrode cut costs, join most weldable dissimilar alloys. Just write us for your copy.

\*Registered trademark

Inco-Weld "A" Electrode was formerly sold as Inco-Rod "A" — this electrode has been improved so that it gives still greater hot ductility — particularly in heavy sections.

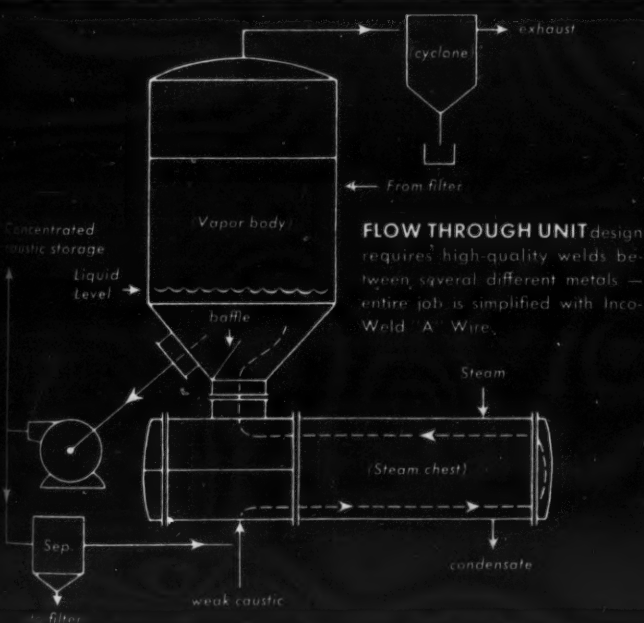


**THE INTERNATIONAL NICKEL COMPANY, INC.**

67 Wall Street



New York 5, N. Y.



## DISSIMILAR METALS WELDED WITH INCO-WELD "A" WIRE

304 to Monel Alloy  
304 to Carbon Steel  
Carbon Steel to Monel Alloy  
Carbon Steel to Inconel Alloy  
Nickel to SA-285  
Inconel Alloy to Hastelloy "C" Alloy  
10% Ni-Clad Steel to 10% Ni-Clad Steel  
Inconel Alloy to itself

## Transformer substations cover most uses, provides savings

**Uses:** Units are designed for economically meeting electrical distribution needs in industrial plants and other commercial applications.

**Features:** Packaged substations are said to offer great savings over custom-designed systems because no special engineering time is required and installation time and expense are cut to minimum. They are sized to meet most industrial requirements.

**Description:** Packaged substations are completely pre-engineered load centers for stepping down primary voltages. They contain both transformer and its primary protective and secondary distribution devices. Units are available in ratings from 45 to 3000 kva for stepping down primary voltages from 2.4 through 13.8 kv to 208/120 through 600 volts.

Four types of transformers are available in these packaged units — oil filled, askarel filled, and sealed or ventilated dry.

(Tranfo units are product of Transformer and Rectifier Div., I-T-E Circuit Breaker Co., Philadelphia 30, Pa.)

Check 2972 opposite last page.

## Insulation adhesives cover wide range

Line of adhesives has been developed specially for application of insulation by plant maintenance engineers. Adhesives have unique combinations of properties which are end result of several years of testing and development specifically for insulation market.

Broad choice of products are offered, from white adhesive-coatings for canvas jacketing, to high-temperature non-flammable adhesives for temperatures to 800°F.

(Special-purpose adhesives are product of Insul-Cooustic Corp., 42-23 54th Rd., Maspeth 78, N.Y.)

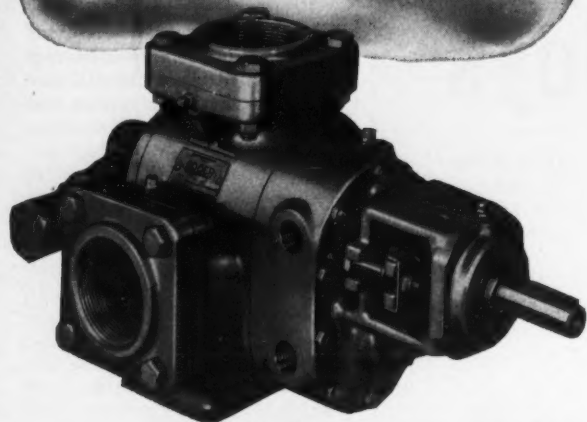
Check 2973 opposite last page.

# PRODUCTS

wires • fluxes  
electrodes

Check 2971 opposite last page

## NEW ROPER PUMP WITH STEAM CHEST



### LOW COST METHOD OF HEAT TRANSFER TO PUMP AND PACKING

Capacities from 27 to 223 GPM  
Pressures Up to 100 PSI

This is the same Roper Series 3600 Pump as found in general transfer installations, but with the added feature of a steam chest. A rotary gear unit, it is available with or without relief valve . . . also furnished with gear reduction, if desired.

#### TWO TYPES OF CONSTRUCTION:

- Spec. 3878 Fitted with Bronze Bearings
- Spec. 4049 All Iron Construction
- All Units Fitted with Aluminum Gaskets and High Temperature Packing

**Steam Chest:** Located between case and outboard bearing to transfer heat to both pump and packing. A low cost method for handling thick, viscous liquids. Can be used with steam, hot water, or heat transfer oil. Pump and steam chest static tested at 300 PSI. Recommended pressure with steam is 125 PSI.

- Four ports in steam chest for installation convenience.
- Hardened gears and shaft precision ground; steel shaft induction hardened.
- Equipped with high temperature packing (600° F. max.) for effective sealing and long life. Pump fitted with aluminum gaskets.

Send for Bulletin No. 29

See Our Catalog in C.E.C.

**Roper Hydraulics, Inc.**  
762 Blackhawk Park Avenue  
Rockford, Illinois

**ROPER  
ROTARY PUMPS**

Check 2974 opposite last page

## ENGINEERING & SAFETY



99.99% chemically  
active . . .

. . .but containing no calcium or chloride, is claim of this ice and snow melting compound. Material thaws ice by depressing the freezing point of water, without generating heat.

In addition, compound will not corrode aluminum and other metals. It leaves no residue, is non-hygroscopic, and will not stick to hands or clog spreaders.

(Melt NC is product of Chem Industrial Co., Brooklyn 9, Ohio.)

Check 2975 opposite last page.

**Nylon stem wiper  
adds to seal life,  
prevents leakage**

Valves guaranteed leak-proof

**Uses:** For hydraulic lines, air lines, manifolds, test stands, and gaging. Valve is particularly suited for locations where abrasive foreign matter is present.

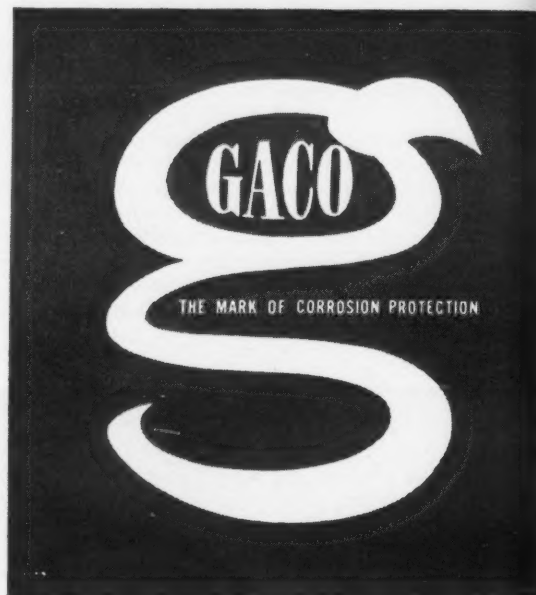
**Features:** Life of valve's leak-proof, O-ring stem seal is said to be materially prolonged by nylon stem wiper. Wiper also prevents foreign matter from scratching or pitting centerless ground stem, thus guarding against leakage at high pressures.

**Description:** Forged needle valves are guaranteed leak-proof through packing from non-critical vacuum to 10,000 psi (WOG) service. Valves have safe, integral bonnet; forged carbon steel bodies in

# NEW GACO N-700A

Neoprene Maintenance Coating

Provides lasting protection against corrosive fumes, splash and weathering, yet requires no acceleration or heat cure! Improved formulation of performance-proven GACO liquid neoprene has better brushability and color stability, can be brush applied to a thickness of 3½ mils in a single coat or hot sprayed, and coats over old or new neoprene without lifting the under coating. Write for details on how "lower applied cost" GACO N-700A can save you maintenance dollars.



### FOR HEAVY-DUTY CORROSION SERVICE THE GACO CORROSION PROTECTION SYSTEM

**Challenge:** When paint or ordinary corrosion protection products won't do the job, specify GACO. A complete line: Neoprene, Natural Rubber, Vinyls, Liquids, Sheet, Putties . . . performance-proven in applications throughout the world. *And A Complete Service.* There's a GACO Corrosion Specialist in your area prepared to serve your needs. Write for further information—we'll forward case studies of interest.



THE MARK OF CORROSION PROTECTION

**GATES ENGINEERING COMPANY**  
Wilmington 99, Delaware  
PIONEER LEADER IN PROTECTIVE COATINGS

AUTHORIZED DISTRIBUTORS IN PRINCIPAL CITIES U.S.A. • AUSTRALIA • BELGIUM  
ENGLAND • FINLAND • FRANCE • ISRAEL • JAPAN • NORWAY • OKINAWA  
PHILIPPINE ISLANDS • PUERTO RICO • SWEDEN. IN CANADA: GACO PRODUCTS  
LTD., BRANTFORD, ONTARIO.

Check 2976 opposite last page

CHEMICAL PROCESSING



angle or globe patterns to a selection of male or female connections; and panel mounting.

Handles are of the cross-bar type in diecast aluminum, painted red. Operating temperatures range from -40 to 500°F.

(Forged needle valves are manufactured by Hoke, Incorporated, 110 Tenakil Road, Cresskill, N. J.)

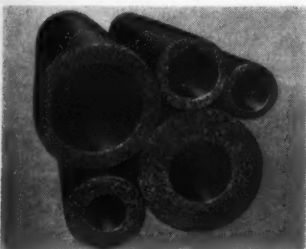
Check 2977 opposite last page.

#### **Slip-on insulation of closed cellular rubber offered**

All standard diameters  
from 3/8" through 4 1/2"

**Uses:** Insulation of all warm or cold fluid piping.

**Features:** Recently developed extrusion process can produce virtually any linear shape. It can be ordered ready to slip directly onto piping or slit lengthwise to be sealed to piping with an adhesive.



Tubing insulation is available ready to slip directly onto piping

**Description:** Closed cellular rubber tubing is offered in wall thicknesses of 3/16", 1/4", 3/8", 1/2", and 3/4", with all standard diameters from 3/8" through 4 1/2". Soft, flexible tubing can be easily installed onto piping with swings and bends up to 180° without additional cutting or fitting. It is lightweight, fire resistant, and impervious to water, moisture, vermin, and rot.

(Closed cellular rubber tubing is a product of Rubatex Div., Great American Industries, Inc., Bedford, Va.)

Check 2978 opposite last page.

# PVC PIPING NEWS

PUBLISHED BY TUBE TURNS PLASTICS, INC. • LOUISVILLE 1, KENTUCKY



## KEY TO BIG COST CUTS

**Users report UPVC piping  
slashes first costs,  
stops maintenance**

Plants, large and small, are switching to unplasticized polyvinyl chloride (UPVC) piping for corrosive services to make these important savings in first costs and in operating costs:

**Lower materials costs.** UPVC piping materials cost substantially less than metals, alloys or lined material commonly used in the same services.

**Lower installation costs.** It can be erected easily and quickly. Widely used socket type joint can be made in about a minute with solvent cement and a brush. Threaded type joint also easily made. UPVC piping is easy to handle . . . weighs 1/2 to 1/6 as much as metal piping. It does not have to be painted.

**Lower maintenance costs.** Users report drastic cost reductions through elimination of piping corrosion, protection against fluid contamination and stopping of galvanic or electrolytic action.

#### **For top quality . . . specify industry's leading line**

The **ttp** line of injection molded UPVC fittings, flanges, valves, solvent cement and thread lubricant is available nearby from your Tube Turns Plastics Distributor. He can supply *all* your needs on one order and can help you with design and installation data. Write us for the complete line catalog, Bulletin 119.

*Leading Manufacturer of Injection Molded Unplasticized Polyvinyl Chloride  
Pipe Fittings, Flanges and Valves*

## **TUBE TURNS PLASTICS, INC.**

Dept. CP-12, 2929 Magazine Street • Louisville 11, Kentucky



More and more engineers specify UPVC with socket type joints and **ttp** fittings to cut installation costs.



Every **ttp** fitting is fully identified . . . even with a quality control code number . . . to guard your reputation.



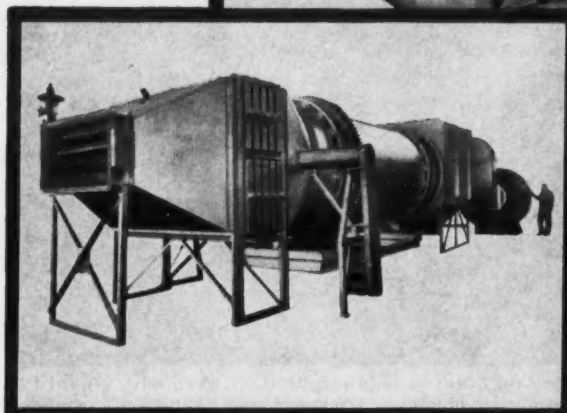
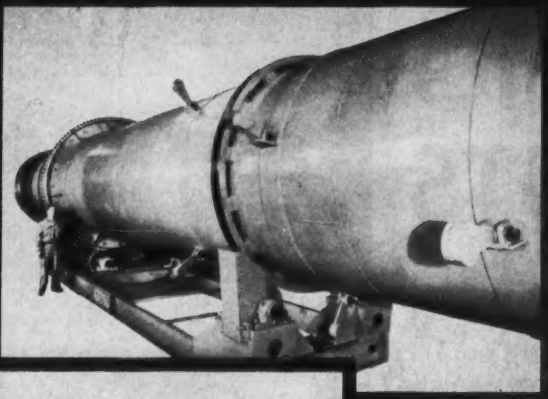
Your nearby distributor of **ttp** products can serve you quickly from the industry's most complete line. Above: At Hajoca Corporation, Chester, Pennsylvania.

Check 2979 opposite last page

# RENNEBURG PROCESS EQUIPMENT

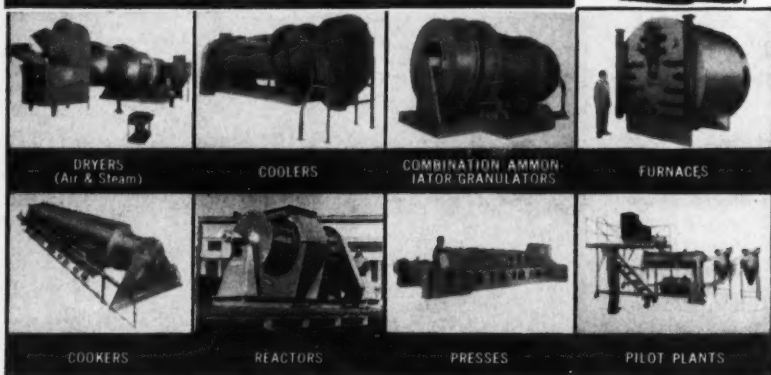
*for the Chemical Industry*

Rotary Cooler  
of heavy  
construction,  
featuring  
highly efficient  
distributing  
flights  
"tailor-made"  
to suit a  
particular  
chemical  
product.



Indirect  
steam-heated  
8-foot diameter  
stainless steel  
Drying System  
for a  
leading  
processor.

SERVING THE  
PROCESS  
INDUSTRIES FOR  
OVER 80 YEARS



KILNS • COMBUSTION EQUIPMENT • CALCINERS • FANS • COLLECTORS  
AIR POLLUTION CONTROL SYSTEMS • AMMONIATORS\* • GRANULATORS\*  
PUG MILLS • EVAPORATORS • MIXERS • ELEVATORS • CONVEYORS • ROASTERS

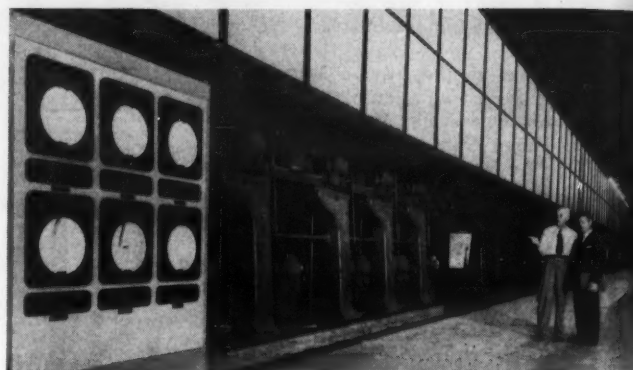
\*TVA Licensed Manufacturer

*Literature and information on request*

## Edw. Renneburg & Sons Co.

2639 BOSTON STREET, BALTIMORE 24, MD.

## PLANT ENGINEERING MAINTENANCE & SAFETY



The Metropolitan, cylinder mill at Whippany Paper. Failure of any gear or bearing would cause entire complex operation to stop — hence, the crucial importance of correct lubrication procedures and products

Enabling two large paper-making machines  
to run continuously —

## Lubricants overcome heat and moisture

Reduction in number of oils and greases required  
saves work, streamlines operation

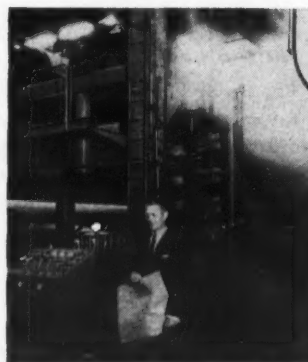
Lubrication setup for two giant paper-making machines placed in service recently helps to simplify a complex operation, permits continuous operation without breakdowns, and protects the expensive equipment from severe operating conditions. The two

large machines are located at the Whippany Paper Board Company's Eden Mill in Whippany, N. J.

In a service analysis made prior to beginning of operations, lubricants were reduced to only 13 different types for the 397 individual points of application. This is done with six general plant oils, two general plant greases, and five special products. Considering the variety and complexity of the equipment, this is a major achievement. It is saving plant considerable work.

One of the new paper machines is a cylinder mill for producing paper such as is found in container board or book matches. It has a speed of 750 fpm, can produce 500 tons per day of paper. The other paper machine is a 240" fourdrinier mill for turning out corrugating chipboard. It has a speed of 1800 fpm.

Each of the new machines



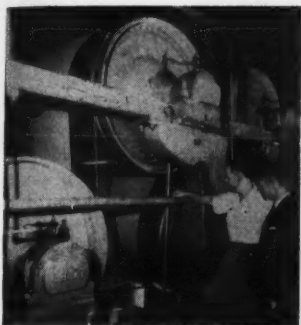
Steam vapor in calender stack indicates severe operating conditions that must be withstood by lubricants used on fourdrinier machine

Check 2980 opposite last page

CHEMICAL PROCESSING

has 100 large rollers for drying the paper sheet. Each roll is supported by two bearings which become hot and sometimes moist from 125-psi steam in dryer drum. Such conditions can cause severe lacquering or rusting of roller bearings if right lubricant is not used.

Largest quantities of lubricants are used in central lubricating systems which circulate clean, filtered oil to all dryer, calender, and reel bear-



Lubricants for cylinder machine flow through pipes to bearings of cylinder mill

ings on machines. Cylinder mill system takes 2100 gallons and fourdrinier mill, 3500 gallons of a special lubricant known as Harmony 76. This lubricant was developed to withstand severe operating conditions that prevail in paper mills. It protects gear surfaces from shock loads and excessive wear.

Most of bearings at wet ends of machines are lubricated with No. 2 grease, which is water resistant. Differential drives on both machines are lubricated with E.P. 75 lubricant. No. 55 turbine oil is used for turbine bearings and gears. No. 155 is used for flexible couplings.

(Lubricants for paper making machines are product of Gulf Oil Corp., Gulf Bldg., Pittsburgh 30, Pa.)

Check 2981 opposite last page.

(Paper making machines, including central lubrication system, were built by Beloit Iron Works, Beloit, Wis.)

Uncommon  
scents  
require  
uncommon  
metering

The delicate ingredients in milady's cologne take more than garden-variety metering—as do the critical ingredients in chemical and food processing, gas odorizing and water treatment.

Accurate, dependable metering assures product quality and uniformity. Hills-McCanna metering and proportioning pumps assure precise metering at low cost. Do as the leaders in industry do—"look to the people who know and control flow."

WRITE TODAY for a copy of our new booklet, "Precision Proportioning Pumps" which explains Hills-McCanna's complete line of pumps.



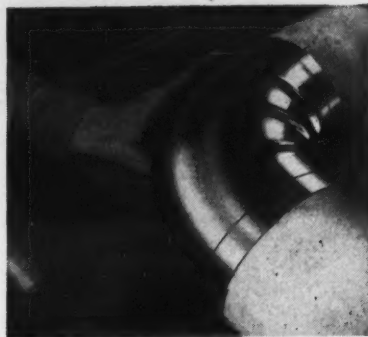
**HILLS-McCANN A COMPANY**  
4571 West Touhy Avenue • Chicago 46, Illinois



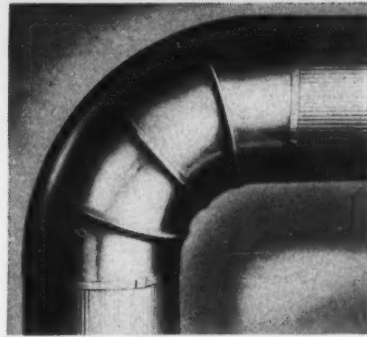




**9:00 A.M.** Workman places two halves of Ell-Jac over insulated elbow. Halves of Ell-Jac are held in place with wire while holes are drilled for sheet metal screws.



**9:04 A.M.** Screws are quickly inserted to hold Ell-Jac snugly and permanently in place. Childers Aluminum Ell-Jacs come in 60 standard sizes for both 90° and 45° long radius elbows.



**9:06 A.M.** Ell-Jac completely installed. When straight line aluminum weather-proof jacketing is added, lines have complete, maintenance-free protection for all costly insulation.

## How New Childers Ell-Jacs Save You Time and Money

Revolutionary new Childers Ell-Jacs go on fast and easy . . . fit perfectly . . . cut installation costs . . . never need painting . . . and, used with Childers Jacketing, give your insulated lines that well-dressed look from end to end.

Now, aluminum elbows are made in a wide range of sizes by America's leading manufacturer of aluminum jacketing. Childers Aluminum Ell-Jacs are available for quick, easy application to protect costly elbow insulation.

Childers Ell-Jacs are two-piece, deep drawn from .020" aluminum, #3003 alloy. They are precision-formed for long-radius elbows and come in 60 sizes for both 90° and 45° ell.

Childers Ell-Jacs, together with Childers Jacketing, now let you install maintenance-free aluminum over every square foot of your valuable insulation. You protect *all* of your insulation investment at lowest cost. You get the bonus of a better looking plant and easier housekeeping.

Positive weather-proofing with Childers Jacketing is assured by exclusive Childers Lap-Seal (Patents Pending). You're sure of getting proper lap without waste. You save labor, too.

Factory attached moisture barrier protects both Childers Jacketing and Childers Ell-Jacs against corrosion that could otherwise damage the underneath side of the aluminum. Its slight extra cost is more than offset by savings in application labor.

You also get greater strength and greater protection because Childers Jacketing is cross-cripped. Cross-

crimping increases the vertical strength and rigidity of a .016" sheet to that of a plain .024" sheet.

It's easy to install Childers Jacketing. All you need are pliers and screw-driver, plus inexpensive strapping. Two men can do the job. Jacketing can be removed for inspection of the lines, then reapplied without waste.

First cost is less for Childers Jacketing than for any other permanent type weatherproofing—even less than some temporary coverings.

You end maintenance worries, too, by using Childers Aluminum Weather-proof Jacketing and Ell-Jacs. Aluminum keeps its new look; needs no expensive periodic repainting.

Why not benefit from Childers world-wide experience when you buy insulation for your lines, towers, vessels, and tanks? More than 2,000 petroleum refining, petrochemical, and chemical plants will endorse your decision. Childers Engineering Representatives, located in 27 major industrial centers, give professional advice on insulation jacketing.

For a free sample of Childers Aluminum Weather-Proof Jacketing, with engineering data on how to safeguard your insulation, write Childers Manufacturing Company, Dept. CP-18, P. O. Box 7467, Houston 8, Texas.

In Canada, write direct to Peerless Mfg. Co., Sub-Post Office 28, Calgary, Alberta.

Only Childers makes available to you complete specifications and engineering data on aluminum jacketing in these catalogs: Sweet's Industrial Construction File pp. 10b/Ch; Chemical Engineering Catalog pp. 1011-1014; Refinery Catalog pp. 317-320.

Check 2983 opposite last page

### ENGINEERING & SAFETY

**Simple, durable pumps provide long service, minimum downtime**

Location of diaphragm facilitates repair

Uses: Units are designed to handle corrosive liquids such as acid, alkalines, oils, and thick solutions or slurries containing heavy materials in solution.

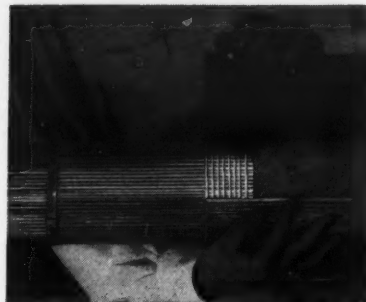
Features: Design emphasis has been placed on simplicity and durability to provide long service life with minimum downtime for repairs. Diaphragm can be serviced easily and quickly by simply removing a bolted cover plate on side of pump. Service line remains connected.

Description: All pump models are equipped with pressure regulator valves to provide protection against over-pressures and to assure constant delivery volume and pressure.

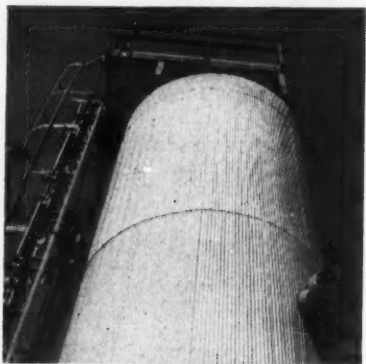
Diaphragm pumps are available in nine standard models with outputs ranging from 2.5 to 35 gpm at 115 psi. Maximum working pressures range from 14 to 230 psi. Pumps are equipped with drive motors ranging from 1/2 to 12 hp, depending on output and pressure.

(Diaphragm-type pump is manufactured by Schweitzer Equipment Co., 3764 Ridge Rd., Cleveland 9, Ohio.)

Check 2984 opposite last page.



**EXCLUSIVE LAP-SEAL**, available at no extra cost, is a series of 8 ribs rolled into the underlapping edge of the jacketing, providing an automatic measure of the 2" circumferential lap. Proper lap is assured without waste. Labor is saved. Where desired, a positive weather seal is easily made with Lap-Seal and a mastic.



**DEEP CORRUGATED** Childers Jacketing in 1 1/4" and 2 1/4" corrugations is recommended for permanent protection and improved appearance of insulated towers, vessels, tanks. Deep Corrugated Jacketing with factory-attached moisture barrier is another product available only from Childers.



"And now we come to marks of identification."

## THAT'S INTERESTING

### De-icer

"Winter-kill" prevention is claim of under-water heat exchanger that may be boon to fishing industry, resorts, and sportsmen.

Aerator attachment for exchanger mixes finely divided water and air streams under pressure. Basic unit prevents ice formation on bays, lakes, harbors, and canals.

(Industrial Research Newsletter, Armour Research Foundation)

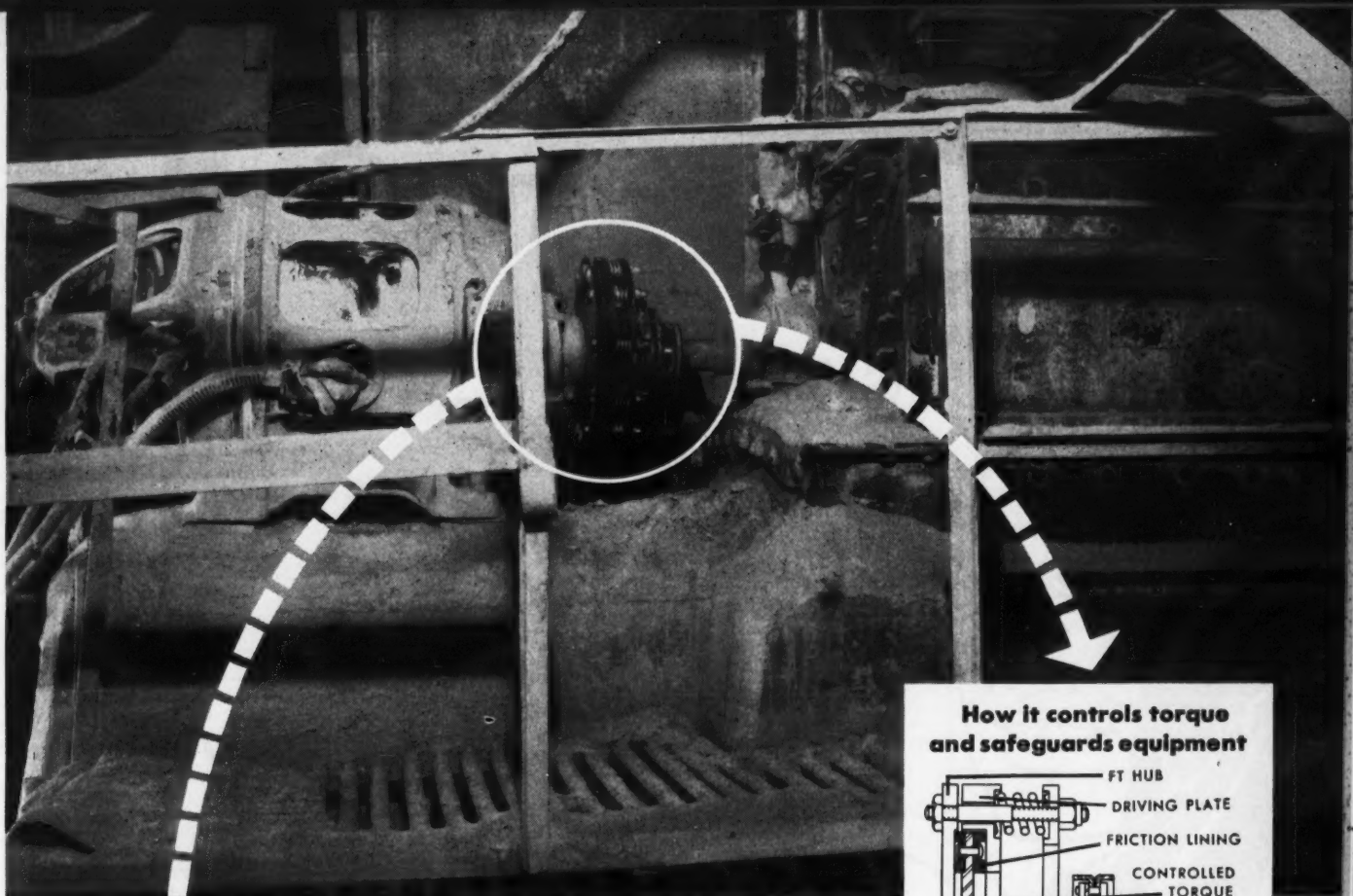
### Quick freeze with old Sol

What is believed to be world's first solar refrigerator has been invented at Israel Institute of Technology, Haifa. Box has thermostat control and freezer. Pipe links it to

roof-mounted radiation collector, designed to store enough solar energy to last three or four cloudy days.

(Industrial Research Newsletter, Armour Research Foundation)

For more information on product at right, specify 2985 see information request blank opposite last page.



## Protect machines from overload damage with FALK Controlled Torque Couplings

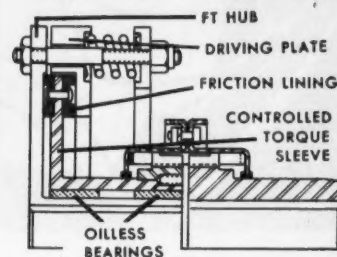
The above picture shows a Falk Controlled Torque Coupling connecting a 150 hp motor to a hammermill. Formerly, when tramp iron got into the mill, it was necessary to rewind the motor at least twice a year. But, in the 2½ years after installing a Falk Controlled Torque Coupling, no motor repairs were required. *That is real saving!*

Wherever overload danger exists, a Falk Controlled Torque Coupling gives positive protection against machinery damage from excessive torque or jams. This unique coupling has an adjustable friction slip clutch which can be set at any predetermined torque limit. Thus, transmission of dangerous shocks is prevented...overloads are limited...shaft breakage is eliminated.

Another big advantage is that, when the cause of the overload is removed, the entire coupling will rotate and transmit power without resetting, and without replacing parts or repairing the coupling....And, the Controlled Torque Coupling incorporates the famous Falk Steelflex torsional resilience to smother ordinary shock and vibration, plus the ability to accommodate shaft misalignment....Consult your Falk Representative or Authorized Falk Distributor. **Ask for Bulletin 4100.**

**THE FALK CORPORATION, MILWAUKEE 1, WISCONSIN**  
MANUFACTURERS OF QUALITY GEAR DRIVES AND FLEXIBLE SHAFT COUPLINGS  
Representatives and Distributors in many principal cities.

### How it controls torque and safeguards equipment



Here (as in photo), the torque-control hub is shown mounted on driving shaft. From this hub, power is transmitted through friction lining to controlled torque sleeve. Load to be transmitted is determined by the (pre-set) pressure on friction lining. In case of overload, this hub still rotates until power is shut off—but the rest of the coupling and the driven machine will slow down or stop.

### Motor Shut-off Control

By adding an automatic cut-out switch with V-belt connection to driven shaft, motor can be stopped immediately. With the standard hub mounted on driven shaft, the switch opens the electric circuit when speed of shaft falls below predetermined value.

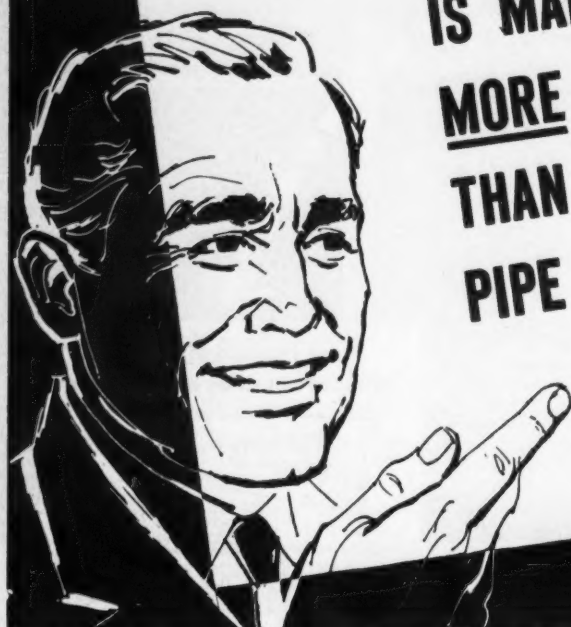
# FALK

...a good name in industry



# UNIBESTOS®

IS MADE WITH  
**MORE AMOSITE ASBESTOS**  
THAN ANY OTHER  
PIPE INSULATION



**It's a *sure* way to save maintenance money!**

Most insulations use merely a scattering of asbestos fibers to hold the mass together. So it's easy to see why UNIBESTOS is far stronger and so much *tougher*. Hammer blows can dent the surface, but never shatter or crack it. You can cut UNIBESTOS cleanly without breakage—walk on it. And, best of all, UNIBESTOS stands up like nothing else can with continued high thermal efficiency.

At competitive prices, rugged UNIBESTOS brings you the added advantages of easy installation, single-layer application, simplified fabrication for curves and fittings, unlimited re-usability, unmatched resistance to water and weather.\* It's the favorite wherever used—the *standard* in modern power plants from coast to coast. We'll be glad to send you complete information on durable UNIBESTOS...the only pipe insulation made almost entirely of Amosite asbestos. Sizes to 44" o.d.

\*An exposed and non-weatherproofed installation of single-layer UNIBESTOS, applied to 1500° pipe although its temperature limit normally is considered as 1200°, already has been removed for pipe inspection four times and re-installed as fully serviceable.



**UNION ASBESTOS & RUBBER COMPANY**  
1111 W. Perry Street, Bloomington, Illinois

INSULATIONS • PACKING • GASKETING • ASBESTOS TEXTILES • INSULATING CEMENTS

Check 2986 opposite last page

## ENGINEERING & SAFETY

**Ruggedness, accessibility,  
ease of adjustment  
valve features**

Maintenance simplified

**Uses:** Flow control of fluids, manual or automatic.

**Features:** Special actuator mounting plate provides maximum support. Actuator may be precisely positioned to deliver maximum power with minimum angularity. Maintenance is greatly simplified by oversized bearing brackets which permit easy access to packing box to insert additional packing, without disconnecting linkage or detaching brackets.

**Description:** Wafer-type butterfly valves come with either power, hand-wheel, or lever actuation. When used with power actuation, de-clutching is provided. Wide range of sizes from two to twenty-four inches are available in cast iron, cast alloys, or flame cut carbon steel. Ratings are to 250 lb ASA iron, and 300 lb ASA steel.

(The 32,000 series butterfly valves are manufactured by Mason-Neilan, A Division of Worthington Corporation, Nahatan St., Norwood, Mass.)

Check 2987 opposite last page.

**Speed reduction variety  
with units that are  
shaft mounted**

Angular as well as horizontal mountings

**Uses:** Units are designed for variety of speed reduction needs.

**Features:** Angular as well as horizontal mounting positions are possible by using either tie rod or foot mountings. Positive lubrication is assured by live-action oil spray generated automatically through gear rotation, regardless of position in which the reducer is mounted.

**Description:** Shaft-mounted speed reducers are available as: Single-reduction drives in six sizes, with nominal ratios of five to one and capacities



## ENGINEERING & SAFETY

up to 50 hp; and, double-reduction drives in seven sizes, with nominal ratios of fifteen to one and capacities to 40 hp.

Precision housing and bearing seals keep oil in and dirt out. Units are furnished with key for hollow shaft sizes and with bushings, complete with key for driven keyseat to adapt hollow shaft bore to smaller driven shaft sizes.

(Shaft-Mounted Speed Reducers are product of Link-Belt Company, Prudential Plaza, Chicago 1, Ill.)

Check 2988 opposite last page.

### Seal makes possible adaptation of pumps for cryogenics

Unconventional unit has added safety feature

**Uses:** For handling cryogenic liquids.

**Features:** Mechanical seal, though unconventional in design, is easy to maintain and operates effectively. Built-in throttle bushing, that prevents hazardous leakage should a seal or bellows failure ever occur, provides added safety feature.

**Description:** Adaptation of standard process pump designs was made possible by development of reliable, economical mechanical seal for very low temperature liquids. Liquid mechanical seal consists of spring and bellows arrangement. Bellows provides necessary expansion to keep rotating face of seal in contact against stationary face even under severe temperature changes. Spring adds strength and eliminates possible fatigue in bellows under all normal operating conditions.

Line of cryogenic pumps includes two vertical models and two horizontal models. Vertical models have capacities of from 650 to 15,000 gpm. Horizontal models have capacities to 5000 gpm.

(Cryogenic pumps are product of Byron Jackson Pumps, Inc., P. O. Box 2017 — A, Terminal Annex, Los Angeles 54, Calif.)

Check 2989 opposite last page.



## **"B&W Tubing cuts fabrication and installation time in process industry"**

Modern processing plants often require special tubing installations. Sometimes it is an unusual tubing length which is required . . . or, perhaps severe corrosion or erosion conditions are the problem. Whatever the case may be, B&W is geared to handle it. For example . . .

A large processing unit needed unusually long length (over 80 feet) stainless steel tubing 8 $\frac{5}{8}$ " OD,  $\frac{3}{8}$ " wall. Buying random lengths, and welding in the field, involved fabricating problems and loss of material. B&W met the problem — for it has facilities to center-weld, hydrostatically test the full length tube, boroscope the weld area, X-ray examine the weld and furnish a proved cut length. *This simplified procurement problems and reduced fabrication and installation time.*

B&W can do the same for you. When you have a tubing problem, call Mr. Tubes, your nearby B&W sales representative — he can help you solve tubing problems. Write for Bulletin TB-417. The Babcock & Wilcox Company, Tubular Products Division, Beaver Falls, Pennsylvania.



TA-8017-PP2

Seamless and welded tubular products, solid extrusions, seamless welding fittings and forged steel flanges—in carbon, alloy and stainless steels and special metals.

Check 2990 opposite last page

**NEW...PYRAMID DESIGN  
INCREASES STABILITY AND  
SAFETY OF  
BALLYMORE  
ALUMINUM Safety-Step  
LADDERS**

**SANITARY • EASY TO CLEAN  
LIGHTWEIGHT • EASY-ROLLING**

Utilizing a pyramid design, new Ballymore Aluminum Ladders are larger at the bottom than at the top, giving the user greater safety and a secure feeling that tends to increase speed, accuracy and efficiency of work.

Construction is tough, all-welded aluminum tubing, reinforced for maximum strength. There are no rivets, bolts or screws to loosen or lose.



MODEL PA-25

MODEL PA5-SH

**12 MODELS TO CHOOSE FROM**, including a convenient, light, 3-step folding ladder. 1-, 2- and 3-step models are available with or without casters. Safety handrails are optional on 2-, 3- and 4-step models, are standard on 5-step ladders. Steps are made of solid, slip-proof ribbed aluminum tread.

Fingertip mobility is provided by large, spring-mounted, smooth-rolling casters which retract under the user's weight. In use, wide-base rubber-tipped legs grip the floor so that ladders are stable and secure.



Write for illustrated folder containing complete information. Ballymore Company, West Chester 10, Pa.

**BALLYMORE  
EQUIPMENT**  
FOR ABOVE FLOOR  
WORKING SAFETY

DISTRIBUTORS IN PRINCIPAL CITIES



Check 2991 opposite last page

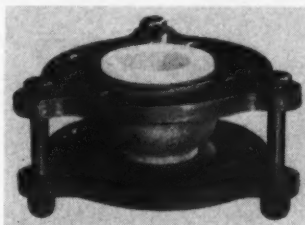
**ENGINEERING & SAFETY**

*Fast field dis-assembly  
of high pressured joints  
permits easy cleaning*

**Uses:** Units are designed for chemical process pipelines.

**Features:** Flange construction permits quick disassembly in the field for inspection and cleaning.

**Description:** Joints and couplings are designed with a flexible member consisting of heat-resistant glass-fiber-re-



Chemically inert expansion joint has heavy-molded Teflon inner liner

inforced silicone casing with a heavy molded Teflon inner liner. Flanges are double-drilled and tapped to fit all commonly used flange materials, including glass, glass-lined steel, cast iron, and steel.

Expansion joints are rated at 150 psi, and are available in standard pipe sizes of 1/2, 3/4, 1, 1 1/2, 2, 3, 4, and 6".

("Tufflex" joints and couplings are product of Chicago Gasket Company, 1271 W. North Ave., Chicago 22, Ill.)

Check 2992 opposite last page.

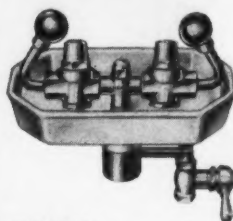
**Vapor adsorption device  
now in standard sizes**

Previously furnished as a specially designed unit, a hydrocarbon vapor adsorption device that provides clean, dry air and gas for chemical manufacturers and ammonia plants, is now available in fourteen standard sizes — eleven for normal pressure applications, three for high pressure applications.

The device utilizes basic principles of capillary physics and surface chemistry for effective liquid-gas separation and operates in two stages. In the first stage, it automatically

*Protect Eyes*

**with HAWS  
EMERGENCY  
EYE-WASH  
FOUNTAINS**



**Model 8930:**  
Basic eye-wash model; enameled iron bowl, chrome plated brass heads. HAWS also offers eye and face wash fountains and drench showers.



Chemicals, foreign particles, caustics — all mean DANGER to eyes! Instant relief is vital! HAWS Eye-Wash Fountains flood the eyes with controlled water streams — soothing, relieving until medical aid arrives. Fool-proof operation activates fountain instantly, possibly avoiding permanent injury. HAWS Emergency Facilities are also widely used for routine cleansing of eyes as a precautionary measure. Write today for illustrated literature on HAWS complete line of emergency facilities.

**HAWS** DRINKING FAUCET CO.  
(Since 1909)  
1443 FOURTH STREET  
BERKELEY 10, CALIFORNIA

Check 2993 opposite last page

**PRATER CAN Solve YOUR!  
AIRLOCK FEEDER PROBLEM**

More than 2000 different Prater Airlock applications have solved processing requirements for 300 concerns. You'll find there IS a Prater Airlock for your need . . . from low pressure dust control to high pressure pneumatic conveying.



**STANDARD DUTY**

Principally adapted for sealing off collectors against air leakage.

Four Sizes . . . 6", 8", 10" and 12".

**HEAVY DUTY**  
For applications involving high pressure Pneumatic Conveying or Volumetric feeding of finely ground materials.

Four Sizes . . . 6", 8", 10" and 12".



**BLOW-THRU**

For pneumatic conveying systems handling flour or similar fine powder or granular material. Available for 2", 3" or 4" Conveying Lines.



Send for informative Booklet P-58  
"How to Select a Rotary Airlock Feeder"

*Foremost Builder of Rotary Airlock Feeders*

**PRATER PULVERIZER COMPANY**

1513 SOUTH 55TH COURT

CHICAGO 50, ILLINOIS

Check 2994 opposite last page

removes water, water-oil emulsion, free oil in droplet form, and dirt from compressed air or gas lines. In the second stage, it removes oil vapor and free oil in the form of mist and fog by passing compressed air or gas through an effective adsorbent. Units are designed to allow for sufficient contact time to enable adsorbent to effectively pick up all of the oil vapor and free oil in form of mist and fog.

(Vape-Sorber is product of Selas Corporation of America, Dresher, Pa.)

Check 2995 opposite last page.

**Easy adjustment made  
on reducing valve  
for gases, liquids**

**Uses:** As reducing valve for handling gases and liquids.

**Features:** Unit employs small air reducing and relief valve for charging diaphragm chamber as means of controlling reduced pressure. This provides an easy adjustment that can be made from a remote point.

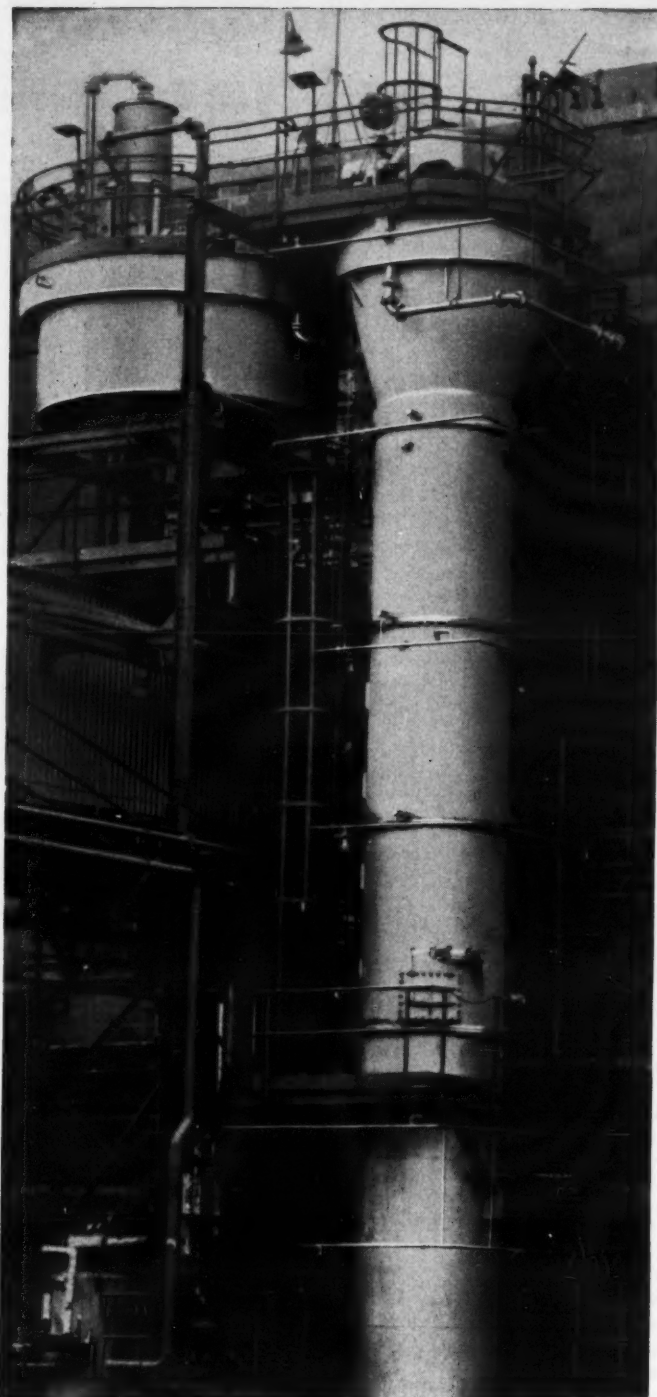
**Description:** High-pressure reducing valve is designed for handling large ratio pressure reductions from 6000 psi initial pressure to outlet pressures of 100 psi upward to within 20% of initial pressure in one stage. Valve is adapted for air, gas, or hydraulic operation.

Trim is stainless steel with spindle and seat ring Stellited. Wearing surfaces are hard chromium plated and polished. Where hydrogen or other gases are to be handled, special nylon seats are available.

(Type E, Fig. 198 reducing valve is product of Atlas Valve Co., 280 South Street, Newark 5, N. J.)

Check 2996 opposite last page.

For more information on developments reported in this section, check corresponding numbers on Reader Service Slip opposite last page of this issue.



Special Manhattan Rubber Lining to resist acidified solvent and abrasive cake is installed in this extraction tower for removal of anti-biotic from mycelia cake.

**PERMANENT  
CORROSION,  
CONTAMINATION  
PROTECTION  
WITH  
MANHATTAN  
RUBBER LININGS**

Manhattan Acid-Proof Rubber Linings are made from thick, multiple calendered sheets of natural or synthetic rubber for utmost protection and durability. These linings expand and contract with the metal under temperature changes . . . won't harden or crack. Resistance to most acids and alkalis is as fool-proof as 65 years experience and advanced technology can provide.

Every Manhattan Rubber Lining is bonded to metal so securely that they can't be separated . . . Every Manhattan Lined tank is tested under high voltage to assure flawless protection before being shipped to your plant. If the equipment *can't* be shipped to Manhattan, skilled crews will line the equipment in the field.

For permanent, positive protection for your processes and equipment, contact the R/M representative at the Manhattan Rubber Lining plant nearest you.

**RUBBER LINING PLANTS AT  
PASSAIC, N. J. and NORTH CHARLESTON, S. C.**

**BELTS • HOSE • ROLL COVERINGS • TANK LININGS • INDUSTRIAL RUBBER SPECIALTIES  
MANHATTAN RUBBER DIVISION — PASSAIC, NEW JERSEY  
RAYBESTOS-MANHATTAN, INC.**

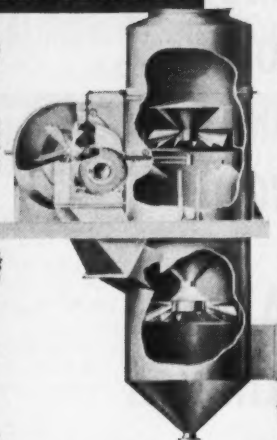
Other R/M products: Abrasive and Diamond Wheels • Brake Blocks and Linings • Clutch Facings • Asbestos Textiles • Mechanical Packings • Engineered Plastics • Sintered Metal Products • Industrial Adhesives • Laundry Pads and Covers • Bowling Balls



Check 2997 opposite last page



...in wet  
dust control



## DUCON DYNAMIC WASHERS

RECOVER DIFFICULT DUSTS  
EFFICIENTLY AND ECONOMICALLY

Ducon UW-4 Dynamic Wet Dust Collectors have added a new dimension in dust recovery. They have replaced, with outstanding success, many more costly and less effective dust collectors in the recovery of "difficult" materials, such as fine and abrasive dusts in kilns, rotary driers and other applications.

The UW-4 Washers are also ideal for high loading conditions where maximum efficiency is desired.

Ducon UW-4 Washers offer other unique advantages, including constant air capacity, low water consumption and rugged construction. They are self-cleaning and fire and explosion proof.

Send for Bulletin W-7456.



the  
name in  
DUST  
CONTROL

THE  
**Ducon** COMPANY, INC.  
167 EAST SECOND STREET • MINEOLA, L.I., NEW YORK

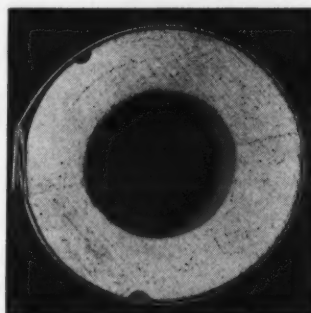
## ENGINEERING & SAFETY

**Cal-silicate insulation,  
metal jacket provided  
in single unit**

Snap on pipe, locks tight,  
all in one operation

Uses: For insulating and  
jacketing pipes.

Features: Product will enable contractors to effect substantial savings since both insulation and jacket can be installed in one operation. Re-



Combination insulation and jacket — can be installed in just 90 seconds

quired installation time, from carton to pipe, is just 90 sec.

Jacketing of aluminum alloy provides good corrosion resistance. There is no electrolytic corrosion of aluminum through direct contact with wet insulation, common where jacket is installed as separate operation.

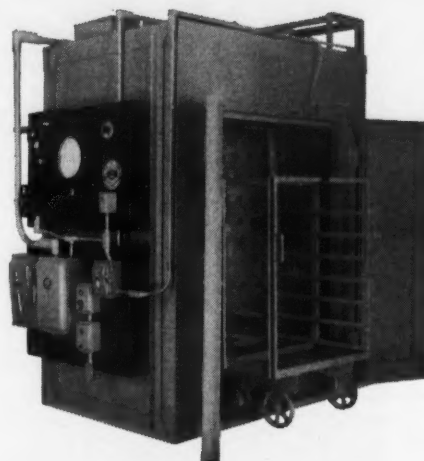
**Description:** Product provides calcium silicate pipe insulation and an aluminum jacket all in a single package. Designed for temperatures up to 1200°F, insulation is combination of .016" aluminum (of correct alloy) integrally combined with a vapor barrier and permanently attached to sections of calcium silicate pipe insulation.

Complete unit is installed by snapping it onto pipe. Joints are sealed with metal "snap straps" held in place with mechanical fasteners. Material is available in 36" sections in complete range of sizes up to 24" pipe size by 3" thickness.

(Metal-On Pipe Insulation is manufactured by Johns-Manville, 22 East 40 Street, New York 16, N.Y.)

Check 2999 opposite last page.

## Completely Controlled for Drying Quality and Safety



No matter what the chemical nature or sensitivity of material to dry, in Rockwell Recirculating Ovens you are sure of complete product uniformity, with complete operating safety.

Standard cabinet and truck type ovens (gas, electric or steam) are available with aluminized steel interiors or with special stainless steel; fume-tight; recirculating fans are interlocked with heating system for shut-off in event of power or fuel supply failure; other safety features.

For drying, baking, curing, evaporating or finishing, Rockwell Ovens are RIGHT for you. What's your heat processing problem?

Write for Bulletins 125 & 126

**W. S. ROCKWELL COMPANY**

2208 ELIOT STREET • FAIRFIELD, CONN.

Sales Representatives in Principal Cities

Check 3000 opposite last page

## Alflex STAINLESS STEEL "MNH" FLEXIBLE CONNECTORS

A NEW stock answer to pipeline problems  
caused by rigid connections.

- Dampens Vibration
- Compensates for Misalignment
- Permits Offset Movement
- Absorbs Expansion

With ALLFLEX Stainless Steel  
Connectors you get:

- CORROSION RESISTANCE... plus
- PRESSURE RESISTANCE... plus
- HEAT RESISTANCE... plus
- FLEXIBILITY

Also available in Monel,  
Bronze and Steel.

WRITE TODAY for fact-filled  
ALLFLEX Bulletin

THESE STOCK SIZES  
1/4" 3/8" 1/2" 3/4"  
1" 1 1/4" 1 1/2" 2"

IN THESE STOCK  
LENGTHS

12" 18" 24" 30"  
36" 48" 60"

... also available in all standard sizes, in any required length, with any standard or special fitting or flange. Full engineering information on ALLFLEX Stainless Steel Hose can be found in: Chemical Engineering Catalog, pages 153 to 156; Refinery Catalog, pages 169 to 172 (Allied A, B, C, D)

ALLFLEX Standard Stainless Steel Connectors are sold through leading Industrial Distributors. If not available locally—THEY CAN BE SHIPPED FROM FACTORY SAME DAY ORDER IS RECEIVED.

**ALLIED METAL HOSE COMPANY**

3784 Ninth Street, Long Island City 1, N. Y. • Stillwell 4-5173

Check 3001 opposite last page

Check 2998 opposite last page

CHEMICAL PROCESSING

THAT'S  
INTERESTING

#### Banishes BO

Company claims development of permanent finish for textiles that will control perspiration and other odors caused by bacterial growth. Control will last through great many repeated washings or drycleanings.

Product is based on electrobiochemical theories. This should prevent growth of bacteria on any natural or synthetic fiber and, therefore, prevent development of odor. There are no toxicity or dermatology effects, and basic material has been approved by AMA and American Pharmaceutical Association.

#### Boat owners — bail out

Lightweight bilge pump made of vinyl plastic provides protection against emergencies. Called the "Thirsty-mate", nonflammable, non-sparking, non-toxic, and salt-water-resistant unit comes in sizes ranging from 18 to 36".

For more information on product at right, specify 3002 see information request blank opposite last page.



## Special Big Tops for Caustics, Open Tops for Brine

*... part of major expansion  
at Port Neches, Tex. petrochemical  
plant at Jefferson Chemical.  
... special Graver cone roof  
design eliminates corrosion  
maintenance problems.*

Conventional cone roof construction would not do for the two largest tanks above. Interior roof structurals could not be protected against corrosion from the 50% caustic to be stored. And so Graver designed the roof structurals on the outside, leaving the interior smooth for easy application of a corrosion-resistant coating.

Three tanks of this special design were built by Graver to answer the corrosion problem at Jefferson Chemical under order from Singmaster & Breyer, Inc., New York, Designers and The Fluor Corporation, Ltd., Los Angeles, Constructors. Also fabricated and erected by Graver were the eight open-top tanks above, used for slurries of raw and treated brine, for treating brine for cell liquor storage, as well as seven smaller open-top tanks and two solid nickel tanks.

**GRAVER TANK & MFG. CO., INC.**  
EAST CHICAGO, IND.

**GRAVER**

*Plants and Offices  
Across America*



Soap solution • Calcium hypochlorite

Water containing abrasive particles • De-

if it will flow • • •

WARREN

will pump it

Acid mine water • Liquid latex

Ammonium sulphate • Demineralized

Trisodium phosphate • Soap solution

50 SSU or 500,000,000 SSU-

Warren can build the right pump

to do the job

RECIPROCATING

CENTRIFUGAL

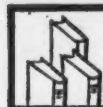
GEAR-SCREW

ASK FOR BULLETINS

WARREN PUMPS, INC.

WARREN, MASSACHUSETTS

Check 3003 opposite last page



## recent books

reviews of current technical and reference work  
... summarized for you by authorities in the  
field with the CP staff

### Fundamentals of High Polymers

During the two or three decades the technology and commercialization of high polymers have advanced with remarkable speed. This 140-page text by O. A. Battista, Research and Development Division, American Viscose Corporation, Marcus Hook, Pa., is designed as an introductory textbook to those who need a basic knowledge of this vast field. A generous supply of schematic illustrations have been included to make certain concepts more understandable.

Chapters on basic chemistry of all the major natural and man-made high-polymer products follow the definitions of key terms. Formation of useful macromolecular products and details of their interesting architecture are described. Sections on measurements of both solutions and solid state properties, and also their physical properties as related to specific end uses, lead up to the final chapter outlining their future.

Of particular help to those not completely familiar with high polymer science is the previously mentioned chapter of definitions. Best definitions available for key terms are presented. By this method the reader is able to gain a clear understanding of the characteristic nomenclature of this subject and can grasp the following text more readily.

The bibliography provides references that have been chosen as the most important contributions in the field. They are organized along topical lines that parallel closely to the subject matter of the text proper.

To obtain "Fundamentals of High Polymers", remit \$5.50 direct to Reinhold Publishing Corp., 430 Park Avenue, New York 22, New York.

### An Introduction to the Chemistry of Fats and Fatty Acids

As implied by the title, this 161-page book is intended primarily to serve as an introduction to the subject. Written by F. D. Gunstone, The University of St. Andrews, the work should be of interest to students, teachers, and chemists and engineers working in the fats and fatty acid field.

The book consists of six chapters. The first is devoted to the general discussion of fatty acids and is followed by description of the chemical nature of fats. Other chapters are devoted to physical and chemical properties, and biochemical and other technical aspects of fats and fatty acids. The book is recommended as an excellent reference to those interested in the subject.

To obtain "An Introduction to the Chemistry of Fats and Fatty Acids" remit \$6.00 direct to John Wiley & Sons, Inc., 440 Fourth Avenue, New York 16, New York.

Check 3004 opposite last page.

### Information and Communication Practice in Industry

Twenty-two leading experts in the field of industrial communications contribute their know-how and experience in explaining the most efficient methods for handling technical information of all kinds. This valuable handbook, edited by T. E. R. Singer, Program Chairman Division of Chemical Literature, American Chemical Society, includes technical writing, editing, illustrating, and classification.

Information services and their part in internal communications, operations re-



search, patent collections, research files, mechanical aid to presenting technical papers, punched cards, training the literature scientist, translating, designing tables of data, and indexing and abstracting are also delineated within its 304 pages.

Many industrial information departments are developed more or less haphazardly according to company requirements rather than by definite plans. This book, besides serving as a guide to setting up an effective and useful information department, provides hundreds of ideas and suggestions for improving company or institutional communications programs. Much attention has been given to providing the necessary tools, and each chapter may be regarded as a pertinent and authoritative guide to a particular aspect of the field.

To obtain "Information and Communication Practice in Industry", remit \$8.75 direct to Reinhold Publishing Corp., 430 Park Ave., New York 22, N.Y.

### Comprehensive Inorganic Chemistry

Volume 7 in an 11-volume reference series on chemical elements and their inorganic compounds covers the elements on compounds of Group IVA. Harold P. Klug of Mellon Institute has coauthored this volume with Robert C. Brasted, one of the editors-in-chief of the series.

Text gives a comprehensive treatment of the chemistry and technology of the five elements, carbon, silicon, germanium, tin, and lead. Information is given on their important inorganic compounds, especially the binary compounds. Data includes occurrence, preparation, physical and chemical properties including reactions and structure, uses, and physiological action.

Particular attention is paid to the new developments of industrial importance. There is up-to-date information about the carbonyl halides;



## UNITRON SEMI-CONDUCTOR RECTIFIER



Simplicity means dependability. Cutaway model of 20 parallel connected cells reveals how insulated conductors pass through iron laminations.

## CURRENT EQUALIZER PROLONGS CELL LIFE AND ASSURES CONTINUITY OF SERVICE

If connected in parallel, semi-conductor rectifying cells will divide the total forward current unequally, due to the difference in forward resistance, causing overloading of the cells with the lowest forward drop.

To make each cell assume its portion of the forward current, the **UNITRON** uses the current equalizer illustrated above so as to permit parallel operation of random selected cells.

The equalizing action is illustrated by Figs. 1 and 2. None of the parallel connected cells is overloaded at rated current and therefore each cell conducts as if it were fed from a separate power source. This materially extends cell life and results in low cell maintenance cost and minimum downtime.

For your new d-c power source, get the economy and dependability available only in the new I-T-E **UNITRON** Semi-Conductor Rectifier. Write for information. I-T-E Circuit Breaker Company, Transformer & Rectifier Division, 19th & Hamilton Sts., Philadelphia 30, Pa.

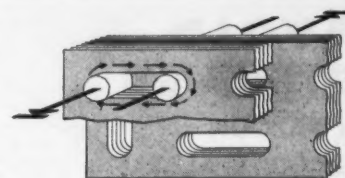


Fig. 1. The two conductors passing through the same window of the iron laminations comprise a 1 to 1 ratio transformer. The currents in the conductors must be equal except for the magnetization current, which does not exceed a maximum of  $\pm 10\%$  of cell current.

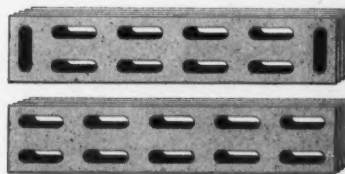


Fig. 2. The iron laminations are divided into two sections, with windows arranged alternately. The windows, when followed progressively in a clockwise direction, form a complete chain in which balance always exists between the current in any one conductor and the currents in the two neighboring conductors.

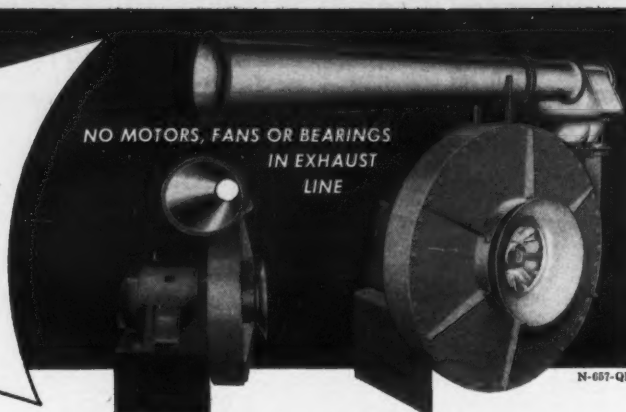


**I-T-E CIRCUIT BREAKER COMPANY**  
PHILADELPHIA, PENNSYLVANIA

Check 3005 opposite last page

**Now . . .**

**you can reduce  
bulk materials  
handling costs  
with *Quickdraft*  
high pressure exhausters**



**FOR MOVING:**

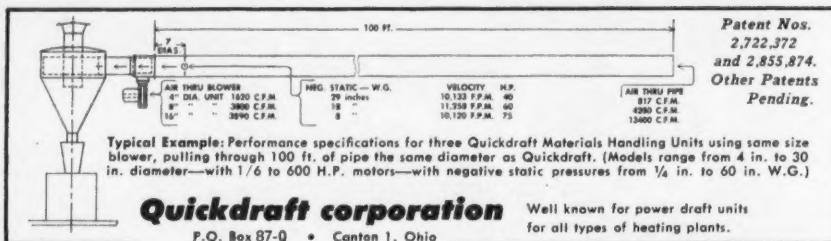
Cement, Sand, Iron Oxide, Wheat, Corn, Salt, Limestone, Castor Beans, Knots, Blocks, Paper, Wool, Cotton, Oats, Rags, Rubber, Vegetables, Coal (Powdered), Shavings, Cork, Sawdust . . . and any other materials that can be moved by air!

**IMPORTANT NOTICE**

For resisting abrasive action, Quickdraft units can be rubber lined. For withstanding corrosive gases, all Quickdraft units are available in standard acid resisting vitreous enamel, No. 316 Stainless Steel, rigid plastics (PVC), and with plastic and fiberglass coatings.

Time and maintenance savings usually pay for Quickdraft high-pressure exhausters in 6 to 18 months on materials handling jobs. Because material does not pass through blower, maintenance is negligible. Downtime for cleaning and replacing fans, motors and

bearings is eliminated. Quickdraft units are also ideal for exhausting paint spray, abrasives, corrosive gases, noxious fumes and high temperatures. For Quickdraft engineering data on materials handling, industrial exhausting, heating plant venting, write today!



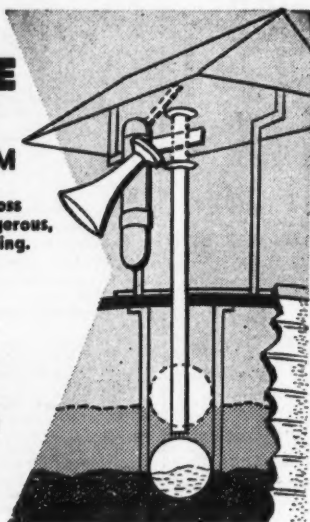
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**AVOID  
SPILLAGE  
with FALCON  
TANK-LEVEL ALARM**

Automatic warning prevents loss of product through often dangerous, always expensive tank overfilling.

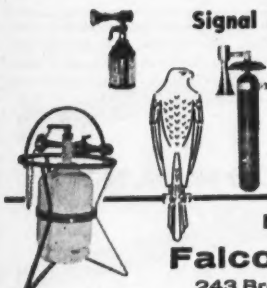
- NON-ELECTRIC
- NON-PNEUMATIC
- SELF CONTAINED
- INEXPENSIVE

Float activates CO<sub>2</sub>-powered horn at predetermined level, instantly sounds alarm.



**Signal Horns by Falcon**

Portable Falcon signallers ideal for 1,001 industrial applications. Round-the-clock fire protection with U/L approved automatic Falcon fire detectors. Self contained, inexpensive, minimum maintenance.



**Falcon Alarm Co., Inc.**  
243 Broad St., Summit, New Jersey

Check 3007 opposite last page

**SURETY  
SURESEAL  
GOES  
HAND in GLOVE  
WITH THE  
TOUGH JOBS**



Your production machinery is an extension of the skilled hands that operate it. Protect those hands with Surety Sureseal gloves.

Sureseal, with exclusive Turn-Cuff, gives maximum security against crippling accidents and skin diseases wherever hands are exposed to chemicals, solvents, oils, etc. Sureseal means savings, too, because production increases and costs drop where injury causes are minimized.

Sureseal, made from Hycar, offers more effective resistance to solvents and other caustic liquids and lasts up to 14 times longer than rubber and other synthetics.

Test Sureseal at our expense. Write us on your letterhead outlining the job requirements and we'll send you a pair of Sureseals by return mail.



**THE  
SURETY  
RUBBER CO.  
CARROLLTON, OHIO**

In Canada: Safety Supply Co., Toronto

Check 3008 opposite last page

**RECENT BOOKS**

the siloxanes, siloxens, and silicon hydrides; the organo-silicon compounds (an entire chapter); the germanium alloys; hexachlorostannic acid; and many binary compounds of these elements that have lately come into quantity production.

Emphasis has been placed largely on chemical properties in relationships and their interpretation in terms of theoretical concepts of atomic and molecular structure. There is a general unity in treatment brought about by adhering very closely to relationships in the periodic system, although each chapter is essentially an independent unit.

To obtain "Comprehensive Inorganic Chemistry, Vol. 7," remit \$7.50 direct to D. Van Nostrand Co., Inc., 120 Alexander St., Princeton, N.J.

Check 3009 opposite last page.

**Technical Editing**

Until now, most publications dealing with the presentation of technical information have focused largely on the activities and functions of technical writers. This book, in the words of the author "... is the first book on technical editing." Within its 278 pages the field of technical editing from the "what" "why" and "how" standpoints is reviewed. And to some extent, the "when" and "where" are also dealt with.

Technical editing has been interpreted broadly to include technical publishing. In the opinion of editor B. H. Weil, a technical editor is almost always a publisher as well as simply the wielder of a blue pencil. Mr. Weil, who is chief editor of the technical information division of the Esso Research and Engineering Co., certainly knows whereof he speaks.

In 1956, Mr. Weil envisioned and planned a "Symposium on Technical Editing." With the help and advice of 20 colleagues in the field, he acted as chairman of the symposium in New York City on Septem-



## RECENT BOOKS

ber 9, 1957. Papers presented at that meeting formed the nucleus of this book.

The book is divided into five sections. These sections are concerned specifically with: editing internal documents, editing journals, editing books and manuals, editing graphic aids and other exhibits. A general section is concerned with techniques and tools, and editing translations.

Authors of chapters in the book are men and women who are long experienced in working with people as well as with words and media. An ability to work with people is not the least of the qualifications a technical editor must have. As Mr. Weil points out, a good technical editor must become a student of applied psychology. The ability to develop a good personal relationship with the writer whose documents he edits, enables the editor to perform his work more capably.

Although, as Mr. Weil himself says, "... much remains to be written on this subject", this book goes a long way toward filling the need for a comprehensive guide on technical editing.

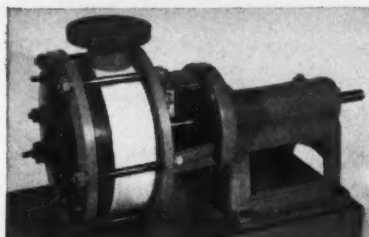
To obtain "Technical Editing", remit \$5.75 direct to Reinhold Publishing Corp., 430 Park Ave., New York 22, N. Y.



"... Daddy's home,  
Daddy's home..."

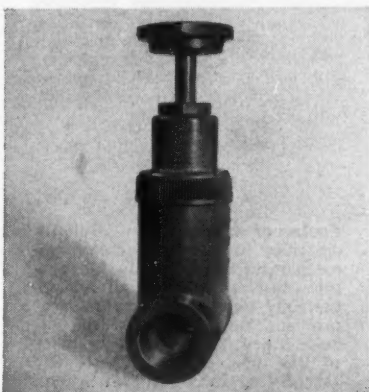
# VANTON *notes on fluid handling*

PUMPS • PIPE • FITTINGS • VALVES



### BRAND NEW: PVC CENTRIFUGAL PUMP.

For acids, caustics, pharmaceuticals, lithographic, plating, and all other kinds of sensitive solutions, Vanton's new PVC pump offers a low-cost answer. Constructed with all liquid-exposed parts of unplasticized, unmodified polyvinyl chloride, these pumps are simple to maintain, and are generally lower in cost than competitive special-alloy pumps. Size range: 10 - 180 GPM. CIRCLE ITEM 12.



### PLASTIC GATE VALVES NOW AVAILABLE WITH SOCKET-WELD ENDS.

A complete line of socket-weld Flex-Plug Plastic gate valves, extending the present line of screwed-end valves, is now available from Vanton in sizes from 1/2"-2" in both PVC and styrene-copolymer. The Flex-Plug valve, first of its kind, offers the combined features of straight through no-pressure-drop flow with close throttling control. The combination of these two features of a gate and globe valve makes the Flex-Plug one of the most versatile available. Now, with the addition of socket-weld ends, the unique plastic Flex-Plug valve can be used on the most severe services in the chemical, pharmaceutical, photographic and other industries. CIRCLE ITEM 11.

Vanton Pump & Equipment Corp., Hillside, N. J.  
Please send booklet circled: 10 11 12

My problem liquid is \_\_\_\_\_

NAME \_\_\_\_\_

TITLE \_\_\_\_\_

FIRM \_\_\_\_\_

ADDRESS \_\_\_\_\_

## Sealless Pump Proves Answer to Quality Plating of Grid Wire

Rejections of silver-plated electronic tube grid wire due to porosity and blackening of plating surface are no longer a problem with engineers at the Wilbur B. Driver Company plant in Newark, N.J., since they discovered that a Vanton sealless plastic pump eliminates the causes. Driver, a manufacturer of quality precision alloy wire, had before this time been confronted with periodic plagues of rejection, foaming of plating solution, pump leakage, shaft scoring, and excessive packing maintenance.

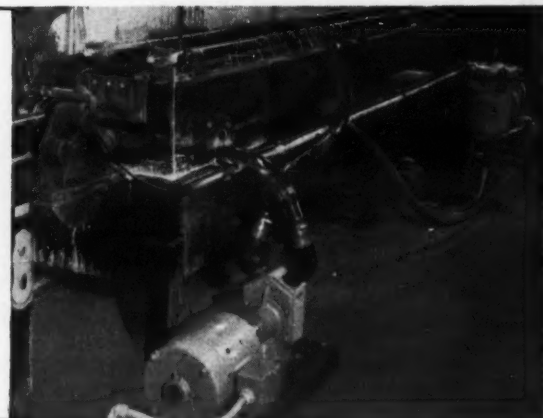
Driver engineers finally traced the trouble to liquid leakage through the packing of the conventional metal pumps then used. This caused not only excessive deterioration of packing, but also scoring of pump shafts through crystallization of salts from the concentrated solution. Furthermore, air entering the pump through the deteriorated packing was causing the silver-plating solution to foam and deposit a porous finish. Constant preventive maintenance of the stuff-

ing-box packing units was tried, but did not solve the problem for more than short periods of time. Increased operating costs and production interruptions remained a plague.

When Vanton plastic sealless pumps were installed, these problems ceased at once. Porous finish, excessive packing maintenance, and resultant production interruptions are no longer a problem. Entry of air bubbles through packing is eliminated, because there is no packing in Vanton pumps. Crystals formed in the solution do not wear Vanton pump components, because their abrasive action is absorbed by the resilient flexible liner. And of course, because the Vanton pump has no stuffing boxes or shaft seals, stuffing-box maintenance and shaft seal leakage are gone for good!

Pump capacities range from 1/4 to 40 GPM. Liners and housings are made in a variety of plastic materials, to suit a wide range of corrosive, acid, and slurry conditions. CIRCLE ITEM 10.

Vanton sealless plastic pump handles a tough assignment to help eliminate leakage, shaft scoring, and other plating problems at Wilbur B. Driver Company plant in Newark, New Jersey.



**VANTON PUMP**  
and Equipment Corp. • Hillside, N. J.

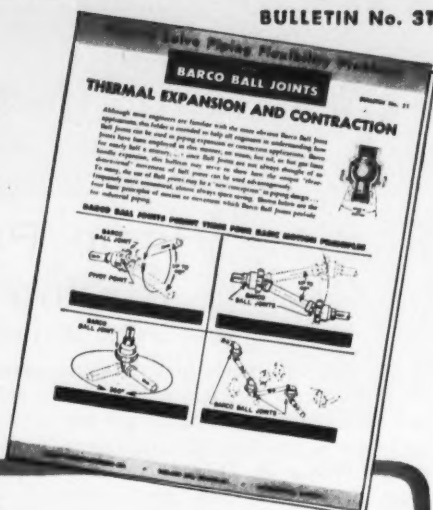
DIVISION OF COOPER ALLOY CORP.

Check 3010 opposite last page



# EVERY ENGINEER will want a copy of this NEW BULLETIN

BULLETIN No. 31



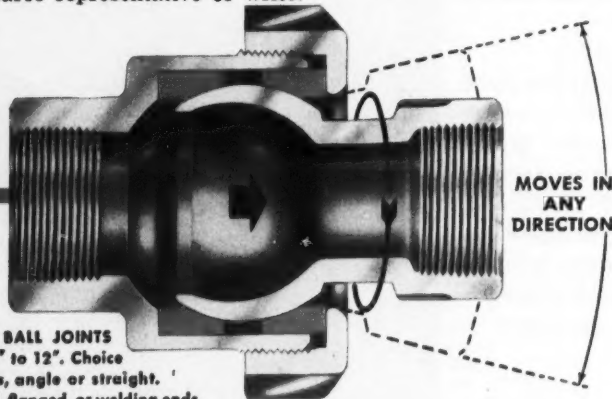
HOW TO SOLVE

## PIPE EXPANSION PROBLEMS

**C**ERTAIN distinctive characteristics and features make Barco Flexible Ball Joints particularly well-suited for solving many present-day plant piping design problems, especially for *Steam Service*:

1. Ability to handle compound movement (where twisting is combined with thermal expansion and contraction).
2. Virtually no deterioration. Able to stay in service for years without repairs or maintenance. No lubrication.
3. No heavy pipe anchoring required. No "end thrust" developed under pressure. Minimum space needed for installation.
4. Maximum safety for high temperature applications. All-metal construction available. Special metals can be specified.
5. Basic design is pressure sealing against leakage and self-adjusting for wear. Suitable for steam pressures to 750 psi and higher.
6. Easy to engineer joints into piping to provide for any degree of flexibility, expansion, or movement required.

New Bulletin No. 31 contains interesting diagrams showing how to solve many common pipe expansion problems **EASILY, ECONOMICALLY**. Ask for a copy; see your nearest Barco representative or write:



**BARCO BALL JOINTS**  
Sizes 1/2" to 12". Choice  
of styles, angle or straight.  
Screw, flanged, or welding ends.



**BARCO MANUFACTURING CO.**  
537-N Hough Street • Barrington, Illinois

The Only Truly Complete Line of Flexible Ball, Swivel, Swing and Revolving Joints  
In Canada: The Holden Co., Ltd., Montreal

Check 3011 opposite last page



## new literature

Industrial bulletins pertinent to the reader . . . offering data on products, processes, services. Additional reviews of catalogs, bulletins, data sheet, etc., are found throughout other sections of this magazine

**Floor trucks** for wide variety of special and standard material handling jobs are described and illustrated in six-page circular which details various applications. Circular 29-D — Lewis-Shepard Products, Inc., Dept. R8-18, 125 Walnut St., Watertown 72, Mass.

Check 3012 opposite last page.

**Processing equipment** for chemicals, food product, and by-products recovery, is described in colorful bulletin of 24 pages. From research to engineering and manufacturing, bulletin illustrates company's production facilities, and variety of processing machines and vessels produced for industry. Bul 385 — Buflavak Equipment Div., Blaw-Knox Company, Buffalo, N.Y.

Check 3013 opposite last page.

**Foolproof slide gate** — Bulletin describes foolproof operating mechanism of slide gate for dry-type dust collectors. Unit assures perfectly tight seal, yet eliminates problem of sticking which has been experienced with other gates of this type. Bul V-2558 — The Ducon Co., Inc., 147 East Second St., Mineola, New York.

Check 3014 opposite last page.

**Dial thermometers** for heavy-duty use under corrosive, adverse conditions are described in 12-page two-color catalog. Cat 225C — Moeller Instrument Company, 132nd St. and 89th Ave., Richmond Hill 18, N. Y.

Check 3015 opposite last page.

**Plastic tooling** — Easy-to-read tabular form employed in six-page bulletin — designed as catalog insert — listing such tooling compounds as gel or surface coating, laminating, casting and high temperature. Also included is list of hardeners for special applications. Industry check list shows many applications of tooling plastics in variety of industries, and indicates specific uses of compounds. Technical Data Bul T1A — Tooling Division, Houghton Laboratories, Inc., Olean, N.Y.

Check 3016 opposite last page.

**Mixer requirements** can be figured on this confidential data sheet supplied by manufacturer. Bul 107 — Mixing Equipment Company, Inc., 185-h Mt. Read Boulevard, Rochester 3, N. Y.

Check 2959 opposite last page.

**Area flow meter** — Handbook of 15 pages gives basic engineering data including tables, graphs, and equations for application, sizing, and flow rate calibration prediction of low flow rate rotameters. Cat 10A9010 — Fischer & Porter Company, 795 Jacksonville Rd., Hatboro, Pa.

Check 3017 opposite last page.

**Filter fabric selection** is detailed in manufacturer's literature that provides answers to the complicated problems of filter media selection. "Filter Fabric Facts" — Wellington Sears Company, Dept. M-12, 111 West 40th St., New York 18, N. Y.

Check 3037 opposite last page.

**PVC corrosion data** is included in 16-page manual on polyvinyl chloride pipe, tubing, and fittings. Resistance to several hundred chemicals is covered. Form PVC-100 — Carlon Products Corp., 10225 Meech Avenue, Cleveland 5, Ohio.

Check 3018 opposite last page.

**Information on fans** for Class I, II, III, and IV service is thoroughly presented in manufacturer's literature. Bul F-104 (Class I and II service) and Bul F-200 (Class III and IV service) — Buffalo Forge Co., Buffalo, N. Y.

Check 3065 opposite last page.

**Variable-speed drive** and pneumatic control systems which permit precise speed selection are illustrated in four-color brochure. Special feature is section on pre-engineered instrumentation packages. Bul F-1882 — U. S. Electrical Motors Inc., PO Box 2058 Terminal Annex, Los Angeles 54, Calif.

Check 3019 opposite last page.

**YOUR  
MOVE**

**FOR  
A**

**BETTER**

## Metallic Filter Cloth

For the most uniform, most accurate metallic filter cloth, specify NEWARK. All weaves, all metals for all types of service, there's a NEWARK filter cloth engineered to meet your requirements. Send for our New Catalog E.

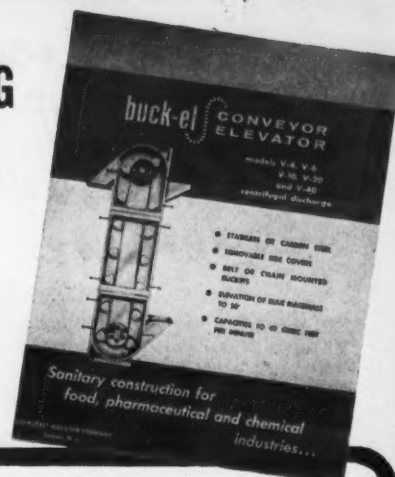
**Newark  
Wire Cloth  
COMPANY**

351 Verona Avenue • Newark 4, New Jersey

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DECEMBER 1958

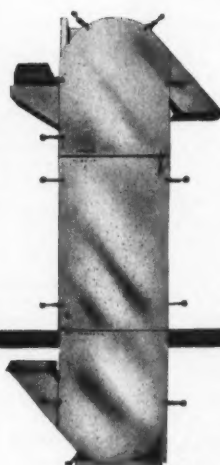
## Write today for NEW FREE CATALOG on BULK MATERIAL SANITARY CONVEYOR ELEVATORS



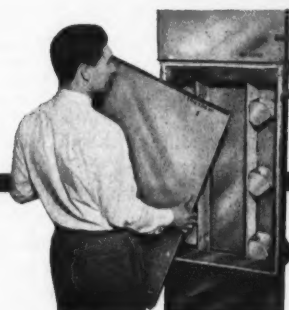
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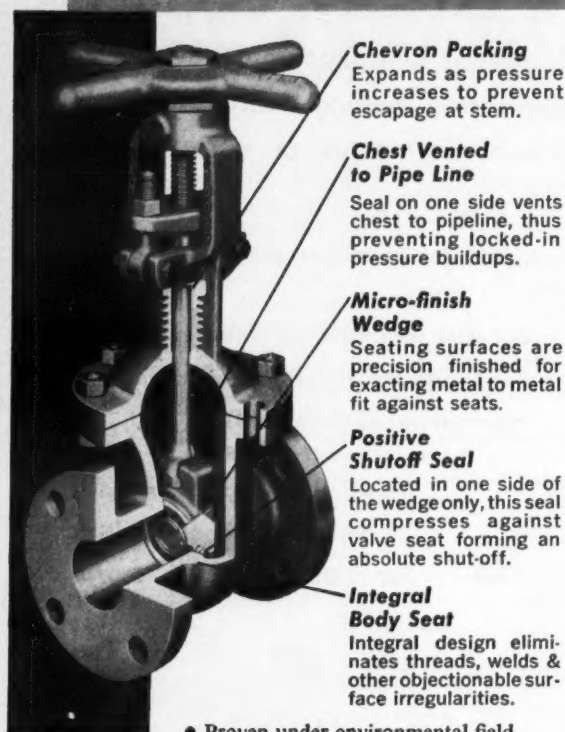
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Check 3021 opposite last page

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Check 3022 opposite last page

## NEW LITERATURE

**Pneumatic conveyor** applications successful in solving material handling problems in the chemical processing industry are detailed in report that is reprinted from a feature article. Special attention is given to consideration of corrosion, contamination, particle size degradation, product discoloration, special alloys, and critical safety factors. Report ER-G-3 — The Fuller Co., Subs. of The General American Transportation Corp., Catasauqua, Pa.

Check 3023 opposite last page.

**Seals for mixers**, in pressure and vacuum applications, are of quick-change rotary mechanical type. Description and other information can be found in Bul 111 — Mixing Equipment Co., Inc., 185-h Mt. Read Blvd., Rochester 3, New York.

Check 2959 opposite last page.

**Polyglycols** what they are and how and where they can be used are subject of 24-page brochure which is revised edition of earlier booklet. Among polyols described are polyethylene glycols, polypropylene glycols, polybutylene glycols, polyepichlorohydrins, polystyrene glycols and miscellaneous polyglycols, including five new trihydroxy polypropylene glycols. "Choosing the Right Glycol" — Technical Service and Development, The Dow Chemical Company, Midland, Mich.

Check 3024 opposite last page.

**Flash drying** is discussed in 8-page illustrated catalog. Various systems are shown and described. Principles of operation, design, and advantages are cited in Bul 85 — Raymond Division, Combustion Engineering, Inc., 1315 North Branch Street, Chicago 22, Illinois.

Check 3025 opposite last page.

**Immersion heater service** is subject of four-page article reprint. It discusses operation and maintenance problems involved with both free-flowing and forced circulations and tells how heaters should be installed for various applications. Bul GER-1161 — General Electric Co., Schenectady 5, N.Y.

Check 3026 opposite last page.

**Power strapping tool** accessories, specifically tool mounts and balance arms, are covered in six-page bulletin that contains parts list, operating specifications, and other requirements. Folder SPD 190 — Signode Steel Strapping Co., 2600 N. Western Ave., Chicago 47, Ill.

Check 3027 opposite last page.

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## STEEL PLATE



Surge tank orifice of heavy plate for Western hydroelectric plant

**... for the Chemical Processing Industry on the West Coast.**

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## What's A "New Solution?"

It's an article in **CHEMICAL PROCESSING** describing a new way of solving a tough plant operating problem. In each issue you will find specific "case histories" showing how these processing problems were solved.

Each article states the operating problem . . . explains the process used and gives details of how problem was solved . . . shows results secured.

Take a look at "New Solutions" articles in this issue — they might suggest a "solution" for some of your tough processing problems.





*It will pay you to investigate*

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**for boiler  
feedwater treatment**



INFILCO'S ADVANCED EQUIPMENT design for this familiar process provides superior treatment for intermediate pressure boilers, usually at lower overall cost than ion exchange.

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1. Clarification
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Check 3038 opposite last page

## NEW LITERATURE

**Portable mixers,** 1/2 to 3 hp, for fluid mixing applications are described in bulletin that lists specifications. Bul 108 — Mixing Equipment Co., Inc., 185-h Mt. Read Blvd., Rochester 3, N. Y.

Check 2959 opposite last page.

**Plasticizer and lubricant** used in manufacture of polyvinyl chloride is water-white petroleum distillate which is said to insure finished plastic free of bubbles and "fish eyes". Current Topics Bul 134 — L. Sonneborn Sons, Inc., 300 Fourth Ave., New York 10, N.Y.

Check 3039 opposite last page.

**Dysprosium metal** — Magnetic properties and relatively high boiling point as compared to cerium group metals distinguish this substance from other rare earth metals. Compared to many rare earths, dysprosium is said to be relatively corrosion-resistant. Cat Sheet 511 — Research Chemicals, Inc., PO Box 431, 170 W. Providence St., Burbank, Calif.

Check 3040 opposite last page.

For more information on developments reported in this section, check corresponding numbers on Reader Service Slip opposite last page of this issue.

**Antioxidants** — Bulletin of four pages describes use and effectiveness of line of agricultural grade antioxidants. Included are results of poultry feeding tests. Methods of addition and suggested concentrations are discussed. Bul G-103 — Eastman Chemical Products Inc., subs. of Eastman Kodak Company, Kingsport, Tenn.

Check 3041 opposite last page.

**Facts on conveyors** for light, medium, or heavy-duty service, as well as oscillating types, are presented in Book 2744 — Link-Belt Co., Prudential Plaza, Chicago 1, Illinois.

Check 2688 opposite last page.

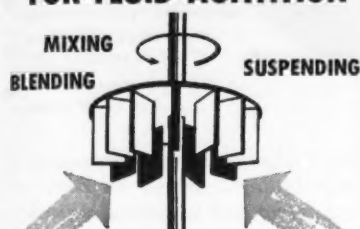
**Water base paints** — Supplier of ingredients to paint, varnish, and chemical industry has compiled a bulletin pointing out advantages of soft amorphous silica in water base paints. Water base paint bul — Tamms Industries Company, 228 N. LaSalle St., Chicago 1, Ill.

Check 3042 opposite last page.

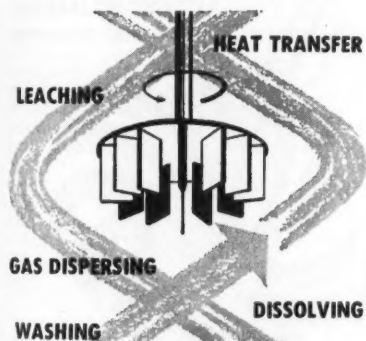


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**INFILCO**  
INCORPORATED TUCSON-  
Dept. I.S. P.O. Box 5033 ARIZONA

Check 3043 opposite last page

## NEW LITERATURE

**Synthetics' products** — Attractive, up-to-date index replaces products chart. Trade name, chemical description and properties of plasticizers, synthetic resins, pentaerythritol, formaldehyde, aromatic acid esters and nonionics are listed. "Synthetics Products Chart" — Synthetics Dept., Hercules Powder Company, Inc., Wilmington, Del.

Check 3044 opposite last page.

**Gate valves**, outside screw and yoke U-bolt types, are described in manufacturer's folder that illustrates and details iron body construction with bronze or stainless steel mounting, and all-iron valves with stainless steel trim. Folder 207 — Jenkins Bros., 100 Park Ave., New York 17, N. Y.

Check 2964 opposite last page.

**Safety equipment catalog** also covers company's research, production, and prescription laboratory facilities. Each item of safety equipment carries complete description, in addition to features, and suggested uses. Safety Equipment Cat — United States Safety Service Co., 1535 Walnut St., Kansas City 8, Mo.

Check 3045 opposite last page.

**Purchasing guide** of 30 pages describes and illustrates products and equipment produced by specialist in fabricating alloys such as stainless steel, aluminum, monel, Inconel, nickel, titanium, and others in gauges up to 3/4". Alloy Purchasing Guide — S. Blickman, Inc., 8400 Gregory Ave., Weehawken, N. J.

Check 3046 opposite last page.

**Spray drying system** advantages and company's engineering services are described in four-page bulletin. Portable, utility, pilot, and industrial spray dryers are discussed and illustrated. Bul 237 — Nerco-Niro Spray Dryer Div., Nichols Engineering & Research Corp., 70 Pine St., New York 5, New York.

Check 3047 opposite last page.

**Magnetic, motorized valves**, their uses and operation, are portion of information contained in 24-page catalog. Flow charts, numerous dimensional drawings, and complete specifications are also included. Cat V-58 — The Mercoid Corp., 4201 Belmont Ave., Chicago 41, Ill.

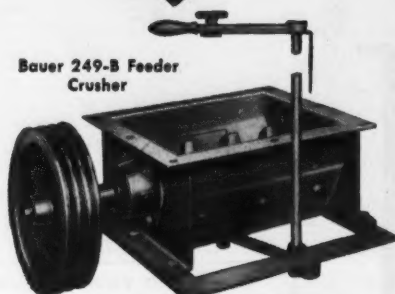
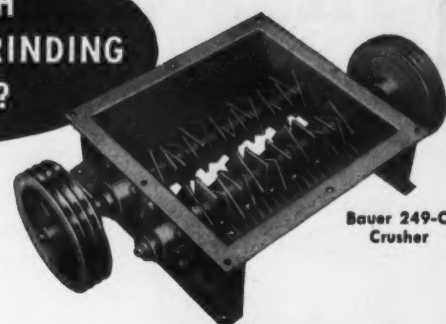
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Here's how to simplify and speed your specification and selection of scrubbers, separators, purifiers and mist extractors. Send for a complimentary copy of these easy-to-use selection tables. With these handy charts, in a matter of seconds you choose units for even the most difficult applications. Our engineering department will be glad to send you these tables to save you time, effort and money. Circle the reader service card now.



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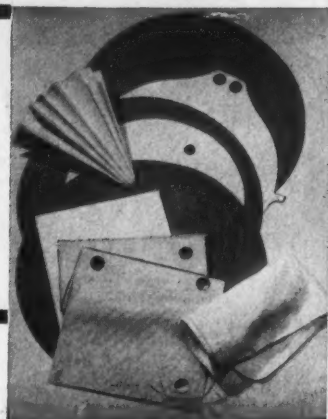
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Check 3052 opposite last page

## NEW LITERATURE

Steam trap engineering manual of 40 pages is intended to assist engineering and maintenance men in sizing, specifying, selection, and buying of steam traps and other fluid specialties. Divided into two sections, manual presents technical information necessary to engineer trap installation as well as complete description of various steam traps and fluid specialties of manufacturer. Steam Trap Selection Manual — V. D. Anderson Co., Div. of International Basic Economy Corp., 1935 West 96th St., Cleveland 2, Ohio.

Check 3053 opposite last page.

Side-entering mixers — Bulletin features description and specifications of side-entering mixers of 1- to 25-hp models. Bul 104 — Mixing Equipment Company, Inc., 185-h Mt. Read Boulevard, Rochester 3, N. Y.

Check 2959 opposite last page.

Drier catalyst which reportedly permits paint formulator to replace lead completely is described and illustrated in 32-page, two-color brochure. Applications, formulations and examples of use shown. Two-page chart explains advantages and functions. Brochure available to anyone in protective coatings or allied industries by addressing: ZIRCO, Advance Solvents and Chemical Div., Carlisle Chemical Works, Inc., 500 Jersey Ave., New Brunswick, New Jersey.

Check 3054 opposite last page.

Single-pan balances from a micro analytical to a heavy duty balance are described and illustrated in 12-page bul. Theory of single-pan substitution type weighing is featured. Bul FS-207 — Fisher Scientific Co., 717 Forbes St., Pittsburgh 19, Pa.

Check 3055 opposite last page.

Infrared heating sections that can be assembled to meet batch-type requirements for baking, drying, and product heating are described in three-color technical data folder. Included are outline and mounting dimensions, detailed application data, and prices. Form 4999 — Lighting Div., Safety Industries, Inc., PO Box 70, Milford, Conn.

Check 3056 opposite last page.

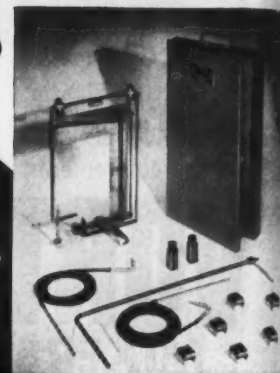
Require special tubing installations? Have specific tubing problems? Then write for Bul TB-417 — Tubular Products Div., The Babcock & Wilcox Co., Beaver Falls, Pa.

Check 2990 opposite last page.



## AIR VELOCITY METER No. 400

One  
Instrument  
Tells Both  
Air Velocity and  
Static  
Pressure!



Reads directly in feet per minute and inches of water.

Check all velocities from 400 to 10,000 F.P.M.

All static pressures from 0 to 10" of water.

Tests fan and blower discharge and inlet pressures, pressure drop across filters, balances air conditioning systems, etc. Complete kit includes dual purpose manometer, 18" stainless steel pitot tube, Magneclips and all necessary fittings, tubings, instructions and accessories.

Write today for literature and prices.

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Check 3057 opposite last page

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HAVE A ROTATING VALVE

... ASSURING NO LEAKAGE  
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No Steam Leakage  
No Wire Drawing

## IT ROTATES

With every discharge, the valve in a Trerice trap seats in a different position ... a new seat ... a steam tight seat every time! Discharging water impinges on the impeller ... causes rotating action.

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A Trerice trap can be inspected and cleaned without removing it from the line, or disturbing the high pressure bolts and gasket.

Removable cap permits quick access to valve and seat for inspection and maintenance.

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We'll supply one, a dozen, or more Trerice steam traps for your operation on a FREE 60-day trial basis. Act now! Write today for bulletin 1400D containing complete engineering data, valve and orifice charts.

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Sales Offices in Principal Cities of U.S.A. and Canada

Check 3058 opposite last page

CHEMICAL PROCESSING

## NEW LITERATURE

**Venturi tubes** for accurate metering of fluids, and other products for positive control of materials in motion are described in eight-page two-color bulletin. Included are telemeters, scanning systems, butterfly valves, valve positioners. Bul 100-R5 — B-I-F Industries, Inc., 345 Harris Ave., Providence, Rhode Island.

Check 3059 opposite last page.

**Polyethylene** for use in flexible pipe is described in six-page technical booklet which includes three tables covering typical properties and typical pipe extrusion conditions, as well as a chart showing long-term burst properties. Details also are given on advantages of higher burst strength, improved heat resistance and longer service life. Bul C-8-258 — Plastics Div., Koppers Company, Inc., 950 Koppers Bldg., Pittsburgh 19, Pa.

Check 3060 opposite last page.

**Management information** including charts, checklists, and other data to help improve business operations are contained in eight-page booklet. Subjects include a "Danger Signals" checklist, itemizing early signs of backsliding, and table of average turnover rates for various industries. "Improving Business" — E. Norman Kagan Company, Empire State Bldg., New York 1, N.Y.

Check 3061 opposite last page.

**Silicon nitride** which has been continually immersed in unalloyed aluminum for 3000 hr with no evidence of attack is covered in eight-page booklet. Another outstanding application for silicon nitride parts appears to be in neutral or reducing atmospheres — where low stresses are involved — at temperatures over 3000°F. F-30114 — Haynes Stellite Company, Div. of Union Carbide Corp., 420 Lexington Ave., New York 17, N. Y.

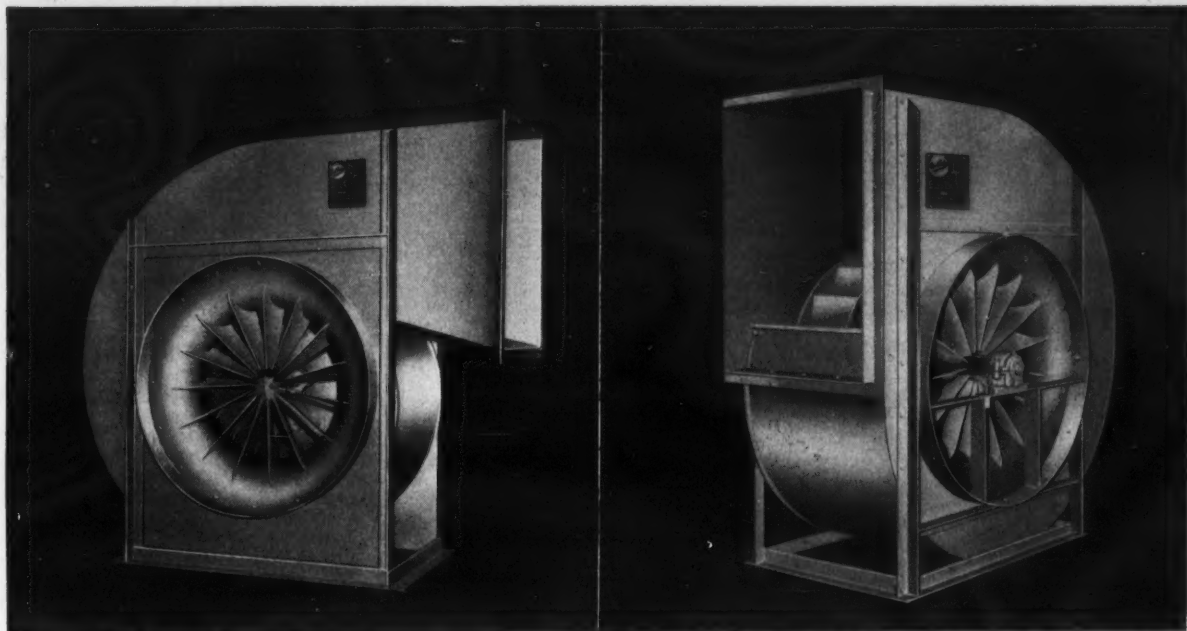
Check 3062 opposite last page.

**Large crawler tractor** capabilities are discussed in 12-page booklet that provides brief specifications on two types. "Increase Power, Production, Profit", Form D841 — Caterpillar Tractor Co., Peoria, Illinois.

Check 3063 opposite last page.

**Change can mixers** of double planetary type are discussed in four-page bulletin. Bul 5A — Charles Ross & Son Co., Inc., 148-156 Classon Ave., Brooklyn 5, N. Y.

Check 3064 opposite last page.



For Classes III-IV (High Pressures) The "Buffalo" Type "BLH" Fan

For Classes I-II (Moderate Pressures) The "Buffalo" Type "BL" Fan

## FOR THE BEST ENGINEERED JOBS, SPECIFY BUFFALO "JOB-SUITED" FANS

For central system applications you don't have to accept a "compromise fan", loosely designed to cover any and all pressure requirements. "Buffalo" builds *two* fans, each engineered to fulfill specific pressure requirements to the highest possible degree. Brief engineering details on these "no compromise" "Buffalo" Fans are given below.

The "Buffalo" Type "BLH" Fan is recognized by engineers and contractors alike for its outstanding performance in Classes III and IV service. The "BLH" maintains an extremely high mechanical efficiency of 86% over a broad operating range. The smooth inlet bell with matching shroud, directional inlet vanes, backward-curved blades and divergent outlet all contribute to quiet operation and minimum turbulence. "Buffalo" engineering features, plus husky construction, add up to an efficient high pressure fan that will deliver long, faithful, maintenance-free service. When you plan a conduit system or other Class III-IV installation, be sure to specify the "BLH". Call in your "Buffalo" representative or write for Bulletin F-200.

You get a *value dividend* with the "Q" Factor — the built-in **QUALITY** that provides trouble-free satisfaction and long life in *every* "Buffalo" product.

The "Buffalo" Type "BL" Fan has gained wide acceptance for peak performance in major Class I and II installations throughout the country. Non-overloading, the "BL" provides quiet, stable, output from free delivery to shutoff. The smoothly-curved inlet bell, with directional guide vanes and matching shroud, assures minimum turbulence. Highest efficiency is attained by the streamlined wheel with backward curved blades, factory tested and balanced to hold vibration to an absolute minimum. The correctly shaped scroll of the wheel-contoured housing further contributes to smooth air flow. For full information on the rugged, reliable "BL" Fan for Class I and II conditions, contact your "Buffalo" engineering representative. Or, write direct for Bulletin F-104.



**BUFFALO FORGE COMPANY • Buffalo, New York**

Buffalo Pumps Division, Buffalo, New York

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

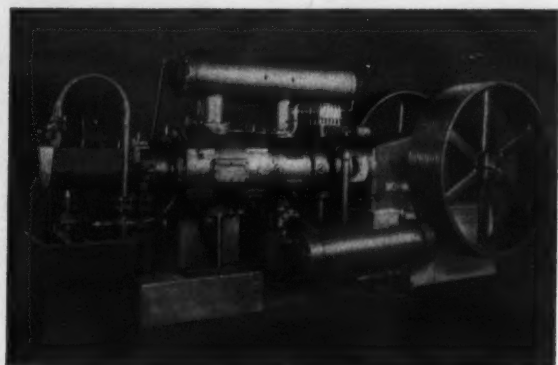
VENTILATING   AIR CLEANING   AIR TEMPERING   INDUCED DRAFT   EXHAUSTING   FORCED DRAFT   COOLING   HEATING   PRESSURE BLOWING

Check 3065 opposite last page



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The five stages on this heavy-duty tandem compressor require less horsepower and develop less heat than in four stages in producing 3000 lb. per square inch pressure in capacities up to 31,000 cfh.

Frames with double row roller bearings, reversible ring plate valves, force feed lubrication, generous intercooler coils are some of the features that make this horizontal compressor compact, sturdy and efficient to operate and maintain.

Every Norwalk compressor is test-run for eight hours at the factory, then taken down for complete inspection before re-assembly and shipment.

Norwalk makes compressors from single stage to six stages, from 125 to 25,000 lb. psi. Catalog on request.



**NORWALK COMPANY, INC.**  
SOUTH NORWALK, CONNECTICUT

**Established 1864**

Check 3066 opposite last page

### NEW LITERATURE

**Antioxidants** for stabilizing inedible animal fats is described in 12-page brochure which outlines nature and problem of rancidity and discusses mechanism by which antioxidants retard its development. A feature is schematic diagram of equipment used in stabilizing fats by proportionate method. Bul G-106 — Eastman Chemical Products, Inc., Kingsport, Tenn.

Check 3067 opposite last page.

**Fine-grinding mills**, laboratory and production model, are discussed in 2 color 4-page brochure. It points out how firms may take advantage of a fine grinding laboratory for custom or experimental work. Bul 0915M58 — Sturtevant Mill Co., 103 Clayton Street, Boston 22, Massachusetts.

Check 3068 opposite last page.

**Combustion system** for use as submerged combustion liquid-heating system is discussed in 4-page bulletin which covers materials of construction, fuels, control, and safety equipment. Schematic diagrams of basic heating system and control system are included. Bul 115 — Thermal Research & Engineering Corp., Conshohocken, Penna.

Check 3069 opposite last page.

**Latex paint** — Architects, builders and members of paint industry will find valuable information on latex paint in recently published booklet telling what product is, what it can do and how it is used. Booklet gives history of latex paint, standards necessary for its quality, and what user can expect from it. Entitled "Why and Where to Specify Latex Paint," booklet is available in limited supply, on letterhead request, from The Dow Chemical Company, Midland, Mich.

**Conveyor pulleys** of solid steel are described in manufacturers four-page catalog which includes complete specifications and price information. Bushings and belt conveyor take-ups are also discussed in Cat CV-1 — Maurey Manufacturing Corp., 2915 S. Wabash Ave., Chicago 16, Ill.

Check 3070 opposite last page.

**Top-entering mixers**, propeller types, ¼ to 3 hp, are described in Bul 103 — Mixing Equipment Co., Inc., 185-h Mt. Read Blvd., Rochester 3, N. Y.

Check 2959 opposite last page.



## Leak Lock **STOPS LEAKS** where other compounds fail!

Here's a simple, economical solution to many troublesome leaking joint problems. Leak Lock holds LP, gasoline, oils, gases, petrochemicals and refrigerants that eat through ordinary joint compounds. Its remarkably tough, highly adhesive, remains flexible indefinitely . . . the joint compound that stretches rather than breaks. Years of use have established its advantages in stopping wasteful or hazardous leaks in the petroleum, chemical, atomic energy, electronic, refrigeration and other fields.

Approval by Underwriters Laboratories for Gas and Oil Equipment List: Also for Propane and Butane.



**FREE SAMPLE** — Leak Lock is available in handy tubes and in cans. Write on your letterhead for sample tube.

**HIGHSIDE CHEMICALS INCORPORATED**  
16 Colfax Avenue • Clifton, N. J.

Check 3071 opposite last page



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These Series "D" Quick Couplings are interchangeable with all popular makes. They are ideal for fluid or gas applications up to 10,000 p.s.i. for compressed air lines, Pneumatic tools, Industrial fluids, Instrumentation, Materials handling.

**Features**

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- **One Hand Operation** Fast and easy. Saves time
- **Full 360° Swivel** Prevents kinking or twisting of hose
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- **Pipe Sizes** 1/8" through 3/4"

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Cleveland—Los Angeles—New York—Providence  
Hamilton, Ont.—Montreal—Toronto

Check 3072 opposite last page

CHEMICAL PROCESSING



## NEW LITERATURE

Utility tractor line is described and illustrated in six-page catalog which covers engineering, design and construction features, and various attachments. Specifications and dimensions are included in Cat UT-103 — Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.

Check 3073 opposite last page.

Virgin timberland development is depicted in 16-page bulletin that describes entire development of chlor-alkali plant from early planning to final operation. How initial plant attracted many other chemical plants to area is also discussed. "A Tall Oak in the South" — Chemical Plants Div., Blaw-Knox Company, Pittsburgh, Pa.

Check 3074 opposite last page.

Viscometer for identifying physical properties of starches by determining viscosity of starch pastes is described in 2-page Bul 201-58 — Gaertner Scientific Corp., 1201 Wrightwood Ave., Chicago 14, Ill.

Check 3075 opposite last page.

Correct lubricants for a number of specific types of equipment operating under normal conditions of speed and temperature are provided in a pre-tested, pre-established list in 20-page bulletin. Detailed information on all lubricants is included. Bul BK-19-a — Keystone Lubricating Company, 3100 North 21st St., Philadelphia 30, Pa.

Check 3076 opposite last page.

Atomic models for constructing organic metal chelate molecular models are described in six-page bulletin. Discussion of metal chelate bonding, dimensions and valence angles of ten models, and examples of their use are included. Bul 1a58 — Arthur S. LaPine & Company, 6001 S. Knox Ave., Chicago 29, Ill.

Check 3077 opposite last page.

Process equipment for chemical and other industrial applications is illustrated and discussed in eight-page bulletin. Equipment is shown for operations such as agitating and mixing, balling or pelletizing, clarifying, wet and dry classifying, cooling, drying, filtering, feeding, flocculating, grinding or pulverizing, lime treating, and heavy-media separating and thickening. Bul 100-B — Hardinge Company, Inc., 240 Arch St., York, Pa.

Check 3078 opposite last page.

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## BAR STOCK VALVES FOR CLOSE CONTROL, ESPECIALLY SUITED FOR CLOSE-COUPLED INSTALLATIONS

• rated for pressures up to 10,000 PSI •

• The bar stock valve, designed originally by R-P&C engineers, is really a versatile performer. First developed for instrument use, bar stock valves have proven to be the answer to valve problems of many different kinds. Designed for close control, they are ideal for throttling service. Their compactness makes them the natural choice for crowded locations such as panel boards. Economically priced, they serve in many applications as general purpose valves. And they are built in a wide variety of materials—can withstand extremely high temperatures and pressures.

For example, the Fig. 1040-A Valve shown here, made from carbon steel, is rated for 10,000 psi at 150°F. Each of these valves is individually tested at

15,000 psi before it leaves the factory.

R-P&C's complete line of bar stock valves includes constructions in 12-14 chromium stainless steel, 18-8 molybdenum stainless steel and bronze. Sizes range from 1/8" to 1" in globe and angle styles with female ends, male and female ends, or male union ends. For extremely severe throttling services, R-P&C bar stocks can be supplied with stellite discs for extra abrasion resistance.

Your R-P&C distributor carries not only a complete line of bar stock valves but also a wide selection of gate, globe, angle and check valves in bronze, iron, and cast and forged steel. You will find the answer to your valve problem in his selection.



### FREE WALL CHART

#### "How to Protect Your Valves"

Installation pointers, operating tips, clues to longer valve life. They are all on this 22" x 17" wall chart. Write for your free copy.

### R-P&C VALVE DIVISION AMERICAN CHAIN & CABLE

Reading, Pa., Atlanta, Boston, Chicago, Denver, Detroit, Houston, New York, Philadelphia, Pittsburgh, San Francisco, Bridgeport, Conn.



Check 3079 opposite last page

# VIBROLATOR

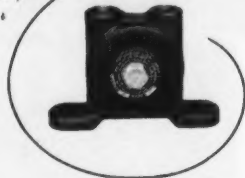
"WORLD'S QUIETEST VIBRATORS"

MOVES MATERIALS

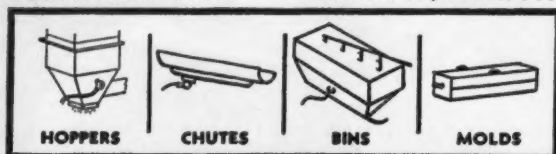
This vibration inducer has only one moving part — a rolling ball. Works perfectly on wet or dirty air. Need no lubricator. Guaranteed self-starting always. Operates continuously in very hot locations. Absolutely spark-free for hazardous jobs.

The Vibrolator moves material out of hoppers, down chutes and through screens. Compacts concrete in forms or granulars in boxes or drums.

Available in 14 sizes, priced from \$12 to \$150. "pocket-watch" size to new 28 lb. UCV-64, shown here. Never harms equipment on which it is mounted. Write for catalog today.



**MARTIN ENGINEERING COMPANY**  
155 KEMP STREET • NEPONSET, ILLINOIS



Check 3080 opposite last page

IF YOU WANT COMPLETE SAFETY  
IN YOUR SAFETY SWITCHES—  
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you can SEE you're safe!

Write for new Safety Switch Bulletin  
Square D Company, 6060 Rivard Street  
Detroit 11, Michigan



NOW... ECA PRODUCTS ARE A PART OF THE SQUARE D LINE

**SQUARE D COMPANY**

Check 3081 opposite last page

## NEW LITERATURE

**Gravity wheel conveyors** — Selection of conveyors, construction features, and accessories available for conveyor adaptations are covered in 16-page bulletin which also deals with various applications to which gravity wheel conveyors have been adapted. Bul RW-58 — Rapids-Standard Co., Inc., 342 Rapistan Bldg., Grand Rapids 2, Mich.

Check 3082 opposite last page.

**Air compressors**, two stage, double acting, angle-type, are subject of eight-page bulletin that points out features, illustrates all components, and lists ratings and principal dimensions. Bul 602-A — Pennsylvania Pump & Compressor Co., Easton, Pa.

Check 3083 opposite last page.

**Chlorate safety wall chart** provides instructions for proper handling of chlorate and perchlorate chemicals. Large chart has digest of safety rules and conduct, and includes first aid section of instructions in case of accident. This unusual chart is limited to organizations working with chlorate and perchlorate chemicals. Safety Wall Chart — American Potash & Chemical Corporation, 3000 West Sixth St., Los Angeles 54, Calif.

Check 3084 opposite last page.

**Ball valves** with double seals and other features are thoroughly detailed in manufacturer's booklet, "At Your Service" — Jamesbury Corporation, 65 New St., Worcester, Mass.

Check 2720 opposite last page.

**Rotary airlock feeder manual** explains how to select proper unit. Detailed descriptions of 27 different airlocks for standard duty, heavy duty and blow-through applications, as well as specifications and dimensional drawings are also presented in 12-page manual. Bul P-58 — Prater Pulverizer Co., 1515 S. 55th Court, Chicago 50, Illinois.

Check 3085 opposite last page.

**Exotic metallic compounds** costing up to \$2850 a pound are contained in published price list of more than 60 of these substances which have many uses in high-temperature, nuclear, and corrosion-, wear-, and erosion-resistant applications. Write to Yonkers, N. Y., laboratory (320 Yonkers Ave.) of American Electro Metal Division of Firth Sterling Inc.

Check 3086 opposite last page.



## HERE'S THE MOST COMPLETE NOZZLE CATALOG EVER PUBLISHED

Whatever your nozzle problem, look first in this new catalog by Spraco. Here is complete information on a wide range of nozzle types and sizes as well as general spraying coverage data.

Send for your **FREE** copy today . . .

**SPRAY**  
Engineering Company

105 Cambridge Street, Burlington, Mass.



Check 3087 opposite last page

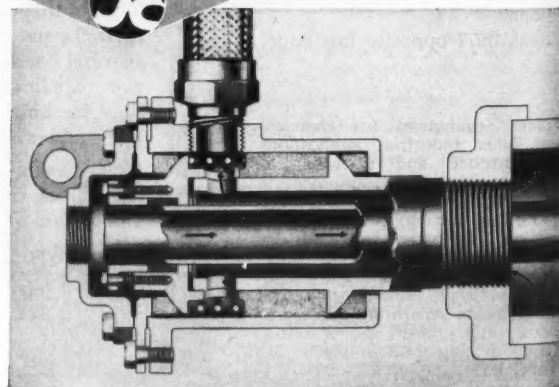
**STANDS ALONE!**

Type SN  
**Johnson**  
ROTARY  
PRESSURE  
Joint

There's not another rotary joint like the Johnson Type SN. Used where inlet or outlet pipe must rotate with the roll—on certain paper machines, drilled rolls of rubber or plastic mills and calendars, double shell dryers, and the like. Needs no external supports of any kind. Like all Johnson Joints the Type SN seals without packing, needs no lubrication or adjustment.

Investigate Johnson Joints for all steam-heated or water-cooled rolls. Handle Dowtherm, Monsanto Aroclors, hot oils too. Sizes to 8". For data on Type SN write for Bulletin N-2002.

THE JOHNSON CORPORATION  
826 Weed St., Three Rivers, Michigan



Check 3088 opposite last page

CHEMICAL PROCESSING

## NEW LITERATURE

**Mixers of all types** for fluid mixing applications are covered in manufacturer's condensed catalog. Bul 109 — Mixing Equipment Co., Inc., 185-h Mt. Read Blvd., Rochester 3, N. Y.

Check 2959 opposite last page.

**Processing equipment** and systems are covered in 8-page condensed catalog. Equipment for size reduction and classification, mixing and blending, material handling, pelleting and densifying, pulp refining, and digesting are covered. Bul 200 — Sprout, Waldron & Co., Inc., 130 Logan St., Muncy, Pennsylvania.

Check 3089 opposite last page.

**ASTM Standards** — All paint, varnish, lacquer and related products' specifications collected in 900-page book which supersedes January, 1955, edition. Approximately 200 D-1 standards in compilation, of which 27 are new, revised or have had status changed recently. Also included are 61 standards approved as specifications of the Federation of Paint and Varnish Production Clubs. "Paint, Varnish, Lacquer, and Related Products" may be obtained by remitting \$8.25 to headquarters, American Society for Testing Materials, 1916 Race St., Philadelphia 3, Pa.

**Cryogenic refrigerator** is described in 4-page folder. Unit described will store chemicals and metallurgical samples at a constant temperature of -320°F. F-1059A — Linde Company, division of Union Carbide Corporation, 30 East 42nd St., New York 17, N. Y.

Check 3090 opposite last page.

**Pneumatic control**, from a systems engineering approach, is discussed in 28-page booklet. Compressed air circuits from central combinations to complex automatically operated system are presented. "Basic Pneumatic Control" — Industrial Products Div. Westinghouse Air Brake Co., Wilmerding, Pa.

Check 3091 opposite last page.

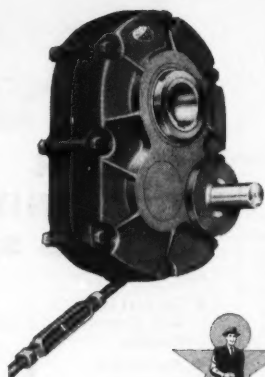
**Adjustable-speed drives** are subject of 10-page booklet. Well illustrated, it contains descriptive information, application guides, technical data, and installation photos. Bul 60-200 — The Electric Products Co., 1725 Clarkstone Rd., Cleveland 12, Ohio.

Check 3092 opposite last page.



THERE'S  
**QUALITY**  
IN TORQUE-ARM

...AMERICA'S MOST WIDELY USED  
SHAFT-MOUNTED SPEED REDUCER



### CALL THE TRANSMISSIONEER

— your local Dodge Distributor. Factory trained by Dodge, he can give you valuable help on new, cost-saving methods. Look in the white pages of your telephone directory for "Dodge Transmissioneer."

Extreme ruggedness and top quality are built into every detail of the Dodge Torque-Arm Speed Reducer—from the specially heat treated helical steel gears to the corrosion resistant semisteel housing. Broad demand has made it necessary to add sizes until today Torque-Arm is America's most complete (and most widely used) line of shaft-mounted speed reducers. Capacities range from 1 to 100 hp; output speeds from 12 to 378 rpm.

Torque-Arm is mounted on the driven shaft, in any vertical or horizontal posi-

tion. It is anchored by the torque-arm fastened to any fixed object. No need for foundation, flexible coupling, sliding base. No lining up difficulties. The unit is driven through any V-belt drive. Savings up to 1/3 are possible and Torque-Arm's efficiency is high. It delivers 97% efficiency in double reduction models; and almost 99% in single!

Ask your local Dodge Distributor—or write us for bulletin.

DODGE MANUFACTURING CORPORATION  
6200 Union Street, Mishawaka, Indiana

**DODGE**  
of Mishawaka, Ind.

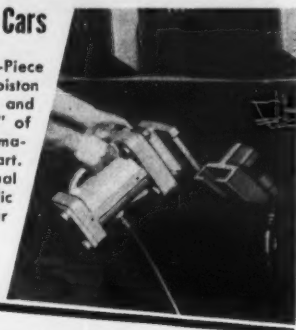
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on Covered R.R. Hopper Cars

Navco "Maintenance-Free" One-Piece MCP Air Vibrators have long piston stroke for maximum amplitude and thrust—eliminate car "clean-out" of potash, cement, and other bulk materials. Piston is the only moving part. "Free-ride" design gives continual effective vibration action. Hydraulic clamp assembly available for car not equipped with brackets.



**MOVE MATERIALS THRU BINS, HOPPERS, CHUTES  
... ELIMINATE POUNDING**

with Navco "Maintenance-Free" One-Piece BH Air Vibrators\*

### "MAINTENANCE-FREE" AIR VIBRATORS FOR ELECTROSTATIC PRECIPITATORS

Can be arranged with solenoid valve for automatic control. One-piece construction means no housing springs, separate striking plate, or assembly bolts to stretch and shear.

**FREE! 26-page Catalog**

Detailed information on models and applications  
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2374 W. 7th St. • Cleveland 13, Ohio

Check 3094 opposite last page

**Viscous Materials**  
**FLOW LIKE WATER**  
through  
**Parks-Cramer Jacketed Pipe and Fittings**

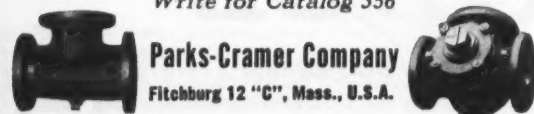
You can't find a better way to convey asphalt, rosin, wax, sulphur, gums, syrups, or other high melting point solid or viscous materials than through Parks-Cramer Jacketed Lines.

Steam, hot water, hot oil, or Dowtherm keep the contents in a quick moving liquid state. Plug-ups are eliminated.

Jacketed Valves and Fittings are stocked in Semi-Steel with Ductile Iron, Ni-Resist, Steel and Stainless Steel available on order.

Piping, Valves and Fittings are stocked in Semi-Steel and are available from 1 1/4" to 8" line size. These include two- and three-way Valves, all standard fitting types, as well as Expansion Joints, Strainers, Flexible Hose and Relief Valves.

Write for Catalog 356



**Parks-Cramer Company**  
Fitchburg 12 "C", Mass., U.S.A.

Check 3095 opposite last page

## NEW LITERATURE

Material handling equipment including safety hoist pumps, insulated safety links, safety hooks for utilities, truck step, and back-up alarm is contained in eight-page catalog that provides dimensions and specifications, and illustrates applications of equipment. Cat 58 — E. D. Bullard Co., Sausalito, Calif.

Check 3096 opposite last page.

Concrete floor repairs and how to make them are photographically demonstrated in this eight-page, two-color bulletin. It includes information on estimating, surface preparation, curing and protecting new or refinished surfaces, and tool and material requirements. Bul 653 — Walter Maguire Co., Inc., 60 E. 42nd St., New York, New York.

Check 3097 opposite last page.

Radiation protection problems pertinent to industry, state and municipal agencies, trade associations, and other groups in the industrial development of nuclear energy are explored in 64-page booklet. Contained are complete texts of papers read by authorities in major fields affected at a New York Conference on the subject. To obtain copy of "Industrial Nuclear Development — A Challenge to the States" remit \$2.00 direct to The National Association of Manufacturers, 2 East 48th St., New York 17, N. Y.

Ceramic magnet separation equipment for continuous and automatic removal of tramp iron in process industries is described in eight-page bulletin. Selection is simplified by means of detailed specifications and dimensions, plus ingenious selection chart that indicates size of separator required for given capacity. Bul 1051 — Stearns Magnetic Products, 635 S. 28th St., Milwaukee 46, Wis.

Check 3098 opposite last page.

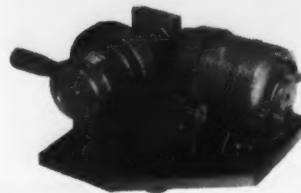
Moisture monitor is described in 4-page bul, including a conversion chart of ppm water to dewpoint. Instrument covers range from 1 ppm to 20,000 ppm water in gases. Bul 1849 — Analytical & Control Instruments Division, Consolidated Electrodynamics Corp., 300 N. Sierra Madre Villa, Pasadena, Calif.

Check 3099 opposite last page.

Mixers for laboratory and small-batch production operations are subject of Bul 112 — Mixing Equipment Co., Inc., 185-h Mt. Read Blvd., Rochester 3, N. Y.

Check 2959 opposite last page.

## DCL metering pumps



The DCL Micro Metering Pump provides a constant flow with facilities for infinitely varying the capacity at will

### CHECK THESE FEATURES

- ✓ Flow controlled by Micrometer adjustment on pump plunger
- ✓ Flow adjustment may be made with pump at rest or while pumping
- ✓ Available in nine (9) capacity ranges 0-7 ccs/hr to 0-1500 ccs/hr
- ✓ Operates at pressures up to 200 p.s.i.

Territories Open For Stocking Dealers

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BEVERLY, MASSACHUSETTS

Check 3100 opposite last page

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THE  
**Marion**  
**MIXER**

... IS STILL THE LEADER

### FOR MIXING:

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A uniform mix is assured time after time, no matter how complicated the formula, and with laboratory exactness. If the formula is right — the MARION MIXER will mix it with complete accuracy.

THE EXCLUSIVE MARION MIXING and BLENDING ACTION will handle any type of chemical materials and give a top quality mixed product at less cost.

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Check 3101 opposite last page

CHEMICAL PROCESSING

## SERV-RITE DRILLED WELLS



thermometer sockets  
thermometer test wells  
thermocouple wells

## FOR PLUS SERVICE

SERV-RITE drilled protecting wells are made in types, lengths, and of alloys to meet any temperature and pressure condition in vessels and flow lines.

Every well is carefully made to assure a plus service. Selected bar stock is machined to within accurate limits. Bore concentricity is held within 5% of wall thickness, depending on well length. They are tested to withstand pressures up to 3000 psi., depending on the wall thickness. Exterior surface has a mirror-like finish for minimum resistance to flow in lines.

Complete assemblies can also be furnished with suitable thermocouple, head, flange, fittings, etc.

Give SERV-RITE a trial on your next drilled well requirements. There is none better.

**Write for Bulletin No. 2000**  
for specifications, size, and ordering information on SERV-RITE drilled wells.

2640

**CLAUD S. GORDON CO.**

Manufacturers • Engineers • Distributors

603 West 30th Street, Chicago 16, Illinois  
2031 Hamilton Ave., Cleveland 14, Ohio

Check 3102 opposite last page

## NEW LITERATURE

**Gravity conveyor** bulletin of 12-pages contains typical applications of manufacturer's conveyor, explains construction features, tells how to select right unit, and includes section on steel and aluminum conveyors. Specifications, weights, and capacities are presented in easy-to-read charts and tables. Bul RR-58 — Rapids-Standard Co., Inc., 342 Rapistan Bldg., Grand Rapids, 2, Mich.

Check 3103 opposite last page.

**Linear-count ratemeter** designed to power scintillation and proportional counting detectors and to measure radioactivity sensed by them is described in 2-page Bul CRM-11 — Nuclear Measurements Corp., 2460 N. Arlington Ave., Indianapolis 18, Ind.

Check 3104 opposite last page.

**Polyethylene emulsion** for use as textile finishing agent is described in 16-page brochure which, it is claimed, contains all information needed by textile chemist to adapt product to his particular process. Product properties, how to prepare emulsions, suggested formulations, notes on how to manufacture large-scale batches and application methods are listed. Variety of tables used. "Emulsified A-C Polyethylene 629" — Semet-Solvay Petrochemical Div., Allied Chemical Corp., 5th Floor T, 40 Rector St., New York 6, N.Y.

Check 3105 opposite last page.

**Ovens and dryers** — Complete line of industrial ovens for baking, drying, curing, and heat treating are described in 16-page catalog. Installation photos are included. Bul 157 — Young Brothers Co., 1831 Columbus Rd., Cleveland 13, Ohio.

Check 3106 opposite last page.

**Tank weighing systems**, based on use of load cells, are detailed in 12-page bul. Many drawings illustrate typical installations for providing indication, recording, printing and controlling in tank weighing installations. Bul. 581 — The A. H. Emery Co., Pine St., New Canaan, Conn.

Check 3107 opposite last page.

**Variable-speed drives** which provide instant and positive speed settings with no perceptible loss of speed regardless of load are described and illustrated in company literature. Books 2274 and 2349 describe drives and controls respectively. Link-Belt Co., Prudential Plaza, Chicago 1, Ill.

Check 2925 opposite last page.

Get the  
**Swagelok**  
**ANSWER...**  
to your  
fitting problem

- In any imaginable shape
- Any machinable metal or plastic
- Sizes for 1/16" through 1" O.D. tubing
- There's a Swagelok fitting for the most critical application
- For pressures or vacuums Swagelok tube fittings provide dependability where it counts

For complete information and catalog write Dept. C6

**CRAWFORD FITTING COMPANY**

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Check 3108 opposite last page





## DEFOAMING PROBLEMS

*solved with the  
MULTIWHISTLE  
Air Jet Generator*



- no maintenance
- no contamination
- no product loss
- no additives

Ultrasonic sound waves! Just sound waves and radiation pressure which together collapse bubbles in seconds.

That's how the Multiwhistle works. No muss — no fuss, no additives to put in or get out. You make full use of equipment capacity, keep foaming to any predetermined level, save on time, labor, and equipment.

And you save on maintenance — there are no moving parts, no electronics. All you need to operate it is a moderate air or gas pressure supply — from 40 to 70 psi.

Find out how little it costs to install a Multiwhistle. Get full information on this new economical approach to perfect defoaming. Write today for Bulletin RB-12.

### VIBRO-CERAMICS DIVISION



**Gulton  
Industries,  
Inc.**  
Metuchen,  
New Jersey

Check 3109 opposite last page

### NEW LITERATURE

Double revolving disc refiners designed for the pulp and paper industry are described in four-page bulletin. Units have fiberizing and dispersing action which preserves fiber length while developing fiber strength and pliability. Bul P-2-B — The Bauer Bros. Co., 1728 Sheridan Ave., Springfield, Ohio. Check 3110 opposite last page.

Engineering drawing use is subject of four-page brochure that explains how photography and drawing combine to save time and money, and make engineering drawings easy to visualize with minimum interpretation. Brochure on Photoneering — Technical Reproduction Service, 375, South St., Newark 5, N.J.

Check 3111 opposite last page.

Bonding of rubber to metal by using two-coat system employing primer and adhesion booster is found to give best results. Universal primer suggested for use with natural rubber, GR-S, Neoprene and butyl stocks with suggested secondary cements. Bul 03-56-8-6-58 — Harwick Standard Chemical Co. of Ohio, 60 South Seiberling St., Akron 5, Ohio.

Check 3112 opposite last page.

Crystallizing equipment, including open and closed evaporator types, vacuum type, and cooling type for continuous operation, as well as batch crystallizers for intermittent operation, are described and illustrated in Bul CE-57 — Struthers Wells Corporation, Warren, Pa.

Check 2866 opposite last page.

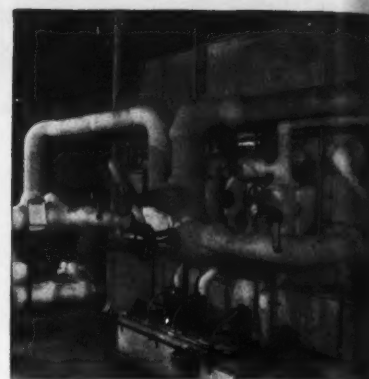
Chloride metallurgy booklet of 36 pages describes use of metal chlorides as raw materials for chemical and metal manufacture and as catalysts. Details are given on  $AlCl_3$ ,  $SbCl_3$ ,  $SbCl_5$ ,  $BCl_3$ ,  $SiCl_4$ ,  $TiCl_4$ , and  $ZrCl_4$ . "Chloride Metallurgy" — Stauffer Chemical Company, 380 Madison Ave., New York 17, N.Y.

Check 3113 opposite last page.

Epoxy pipe reinforced with fine glass fibers is subject of 16-page bulletin. Several pages are devoted to corrosion resistance of the pipe. Engineering data, installation procedures and application data are included. Bul 20 — Fibercast Co., Division of Youngstown Sheet and Tube Co., PO Box 727, Sand Springs, Oklahoma.

Check 3114 opposite last page.

## ... a machine with "A GOOD RECORD as a REVENUE PRODUCER"



A typical case of using a Niagara Aero Heat Exchanger to provide cooling for production equipment shows amortization of this machine in 16 months and \$90 per day revenue thereafter.

Industrial engineers with careful cost, upkeep and revenue records on all machines, credit Niagara Aero Heat Exchangers with important gains over other methods.

They use these machines to provide cooling for production equipment, welders, extruders, drawing dies, fur-

naces, quench baths, plating, chemical and electronic process...all millwater system uses.

They get positive control of critical process temperatures with improved product quality, rejection losses prevented. Heat is removed at the rate of in-put.

A closed system, dirt free prevents all troubles from bad water; transferring heat to the atmosphere by the evaporation of a very small amount of water solves all problems of water supply or disposal.

Write for Bulletins 120, 135

## NIAGARA BLOWER COMPANY

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Niagara District Engineers in Principal Cities of U. S. and Canada

Check 3115 opposite last page



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on your fluid highway**

**HENSZEY  
FLOW INDICATOR**  
*with Alarm Control*

**RINGS A BELL—LIGHTS A LIGHT or  
ACTIVATES a MOTORIZED VALVE**

There are only three moving parts in the HENSZEY FLOW INDICATOR — assures trouble-free operation. Fits anywhere in a horizontal line — without supports. Indicates flow within 3% absolute accuracy, even with pulsating flow. Send for bulletin.

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Dept. P WATERTOWN, WISCONSIN



**Signals Alarm at High  
and Low Flow.  
Simple Adjustable Setting.**

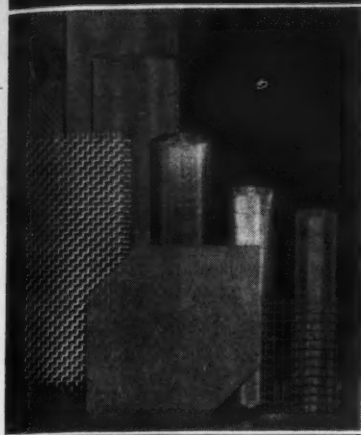


Check 3116 opposite last page

CHEMICAL PROCESSING



from a small piece



to a carload...

**Call Cambridge**  
for Industrial Wire Cloth

Almost any standard mesh or weave, in any metal or alloy, that you might need is right here at Cambridge—waiting for your call. Partly, that's the secret behind the confidence purchasers have in ordering from Cambridge. They know their order will be filled promptly! Then too, they're sure of getting quality wire cloth. Every operation in the production of Cambridge wire cloth is rigidly controlled to assure accurate mesh count and uniform mesh size. Each loom is individually operated and the cloth is constantly inspected.

**IF YOU NEED WIRE CLOTH FABRICATIONS**

—we can build them quickly and accurately from your prints. Or, our engineers will draw up prints for your O.K. Why not get in touch with your Cambridge Field Engineer soon, and find out all that Cambridge offers you in the way of wire cloth. He's listed in the phone book under "WIRE CLOTH". Or, write direct for FREE 94-PAGE CATALOG and stock list giving full range of wire cloth available. Describes fabrication facilities and gives useful metallurgical data.

**The Cambridge Wire Cloth Co.**

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METAL MESH  
CONVEYOR BELTS  
WIRE CLOTH  
FABRICATION

OFFICES IN PRINCIPAL INDUSTRIAL CITIES

Check 3117 opposite last page

DECEMBER 1958

**NEW LITERATURE**

**Carbon-14** labeled compounds are listed in new catalog of radiochemicals which contains 12 pages. A feature is cross-referencing of names of compounds to enable user to easily find desired items. Production of 38 new compounds is announced. "Radiochemical Price List 1058" — Research Specialties Co., 200 South Garrard Blvd., Richmond, Calif. Check 3118 opposite last page.

**Forged steel valves** with a long history of performance in hydrocarbons, nitrogen, hydrogen, and naphtha fractions are described in Cat 58-B — Orbit Valve Company, Dept. B, PO Box 699, Tulsa, Okla.

Check 2853 opposite last page.

**Vibratory packers and jolters** are subject of four-page catalog section. Description, specifications, and illustrations for eight electromagnetic vibratory packers and two hydraulic packers or jolters are provided. Packers, jolters Cat Sec — Syntrol Co., 110 Lexington Ave., Homer City, Pa.

Check 3119 opposite last page.

**Laboratory flowmeters** are described in 2-page specification sheet. Kit of 3 variable-area flowmeters with rubber hose connectors provides means of checking field or laboratory flows. Spec. sheet 10A1027A-LK — Fischer & Porter Co., 814 Jacksonville Rd., Hatboro, Pa.

Check 3120 opposite last page.

**Sucrose solutions** — Viscosities of these substances at various temperatures are to be found in seven-page publication containing revisions of tables previously presented in circular released to industry. Data of especial interest to sugar industry is that new value of 1.0020 centipoises is used. "Viscosities of Sucrose Solutions at Various Temperatures: Tables of Recalculated Values" may be obtained by remitting 5 cents to the Superintendent of Documents, U.S. Government Printing Office, Washington 25, D.C.

**Automatic controls** for heating, ventilating, and air conditioning control systems are described in 52-page catalog. Operational and application data are incorporated with description of each control component. Cat 26 — Automatic Controls Div., Barber-Colman Co., Rockford, Ill.

Check 3121 opposite last page.



# PEABODY DELIVERS MORE!

• **Compact**

Minimum diameter  
Minimum height—due  
to maximum efficiency  
with few contact stages

• **Efficient**

High absorption rate  
High heat transfer rate  
Effective agglomeration  
Maximum cleaning effect  
Intimate gas-liquid contact

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Corrosive fluids  
Various process cycles  
Clear liquids or slurries  
Several types of contact stages  
Inlet dust loadings—to 100 grains/cu. ft.  
Particle size—plus 20 microns to sub-micron fume

• **Economical**

Low liquid pressure  
Low gas pressure loss  
Low liquid consumption

• **Flexible**

Installation—vertical  
or horizontal  
Pressure—1 p.s.i.a. to  
465 p.s.i.a.  
Material—alloys, lead,  
rubber, plastic  
Capacity—100 to 200,000  
S.C.F.M.  
Temperature—to 3500° F.

**PEABODY ENGINEERING CORPORATION**

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OFFICES IN PRINCIPAL CITIES

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**STANDARD SK Type "BD" Heat Exchanger**, two-pass design for service in petroleum, power, chemical processing, and other industries. Also made in single-pass design.



**SPECIAL SK Radifin Air Cooler**, one of two large coolers designed and manufactured for a special project. SK welcomes inquiries for special units—will gladly offer experienced assistance.

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"Feedwater Heater Standards" is a publication of 24 pages devoted to new material relating to design, construction, and installation of feedwater heaters. This second edition is bound in semi-flexible simulated leather and is designed to permit easy insertion of addenda. To obtain "Feedwater Heater Standards", remit \$2.00 direct to Feedwater Heater Manufacturers Association, Inc., 53 Park Place, New York 7, N.Y.

**Filter holders** using nylon-reinforced membrane filter for application in plants and labs for absolute removal at high flow rates of all particulate material (including bacteria) down to 0.45 microns from liquids and gases are described in 16-page technical brochure. "1958 Supplement" — Millipore Filter Corporation, Watertown 72, Mass.

Check 3125 opposite last page.

**Air circuit breaker** information including dimensions, applications, and prices is contained in 56-page illustrated catalog. Central selection chart indicates ratings, overcurrent devices, attachments, and modifications available on individually enclosed circuit breakers. 1958 Speedfax Cat — I-T-E Circuit Breaker Company, 19th & Hamilton Sts., Philadelphia, Pa.

Check 3126 opposite last page.

**Mixers**, top- or bottom-entering, turbine, paddle, and propeller types, 1 to 500 hp, are covered in Bul 102 — Mixing Equipment Co., Inc., 185-h Mt. Read Blvd., Rochester 3, N. Y.

Check 2959 opposite last page.

**Oscillograph recorder**, recently designed as a portable 2-channel package instrument, is fully described in 4-page bulletin. Operating data is listed on this recording unit which requires no additional equipment for operation. Mark II Bul — Brush Instruments Div., Clevite Corp., 3405 Perkins Ave., Cleveland 14, Ohio.

Check 3127 opposite last page.

**Industrial truck batteries** are detailed in 12-page bulletin that covers plate and cell construction, weights, sizes, and tray arrangements for rider and hand trucks, and connector data. Bul IT-528 — C & D Batteries, Inc., Washington & Cherry Sts., Conshohocken, Pa.

Check 3128 opposite last page.

To page 198

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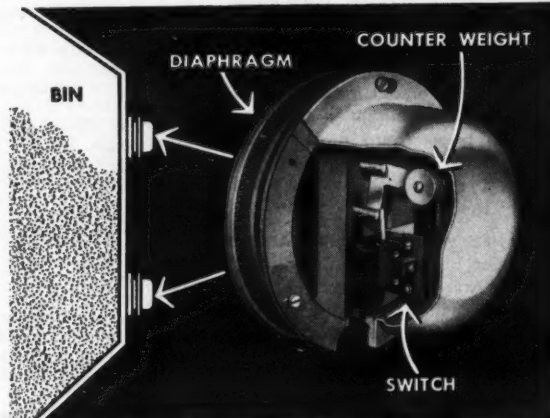
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CHEMICAL PROCESSING



## ADVERTISERS

### in this issue

Abbe' Engineering Co. ....	146
Abbe' Inc., Paul O. ....	150
Airetool Manufacturing Company .....	195
Allen-Bradley Co. ....	107
Allied Chemical Corporation, General Chemical Division .....	62-63
Allied Chemical Corporation, National Aniline Division .....	2nd Cover
Allied Chemical Corporation, Solvay Process Division .....	65
Allied Metal Hose Company .....	172
Allis-Chalmers, Industrial Equipment Division .....	95
Allis-Chalmers, Industries Group .....	102
Aluminum Company of America 44-45 ..	86
Aluminum Company of America, Chemi- cals Division .....	25
Amercoat Corporation .....	4th Cover
American Agile Corp. ....	125
American Chain & Cable, Helicoid Gage Division .....	77
American Chain & Cable, R-P&C Valve Division .....	187
American Hard Rubber Company, Division of Amerace Corporation .....	153
American Machine & Metals, Inc. Ni- agara Filters Division .....	196
American Machine & Metals, Inc., Tolhurst Centrifugals Division .....	197
American Potash & Chemical Corpora- tion .....	72
American Steel & Wire Division, United States Steel Corporation .....	79
Ampco Metal, Inc. ....	125
Anderson Co., The V. D., division of International Basic Economy Corpora- tion .....	183
Antara Chemicals, A Sales Division of General Aniline & Film Corporation ..	60
Appleton Electric Company .....	106
Armstrong Machine Works .....	5

Abcock & Wilcox Co., The, Refractories Division .....	147
Abcock & Wilcox Company, The, Tubular Products Division .....	169
Bailey Meter Company, Chemical and Petroleum Division .....	111
Ballymore Company .....	170
Barber-Colman Company .....	116
Barco Manufacturing Co. ....	178
Bauer Bros. Co., The .....	183
Belmont Packing & Rubber Co., The ..	118
Bin-Dicator Co., The .....	194
Bird Machine Company .....	7
Black, Sivalis & Bryson, Inc., Safety Head Division .....	114
Blaw-Knox Company, Power Piping and Sprinkler Division .....	126
Brush Instruments, Division of Clevite Corporation .....	109
Bucket Elevator Company, The .....	179
Buffalo Forge Company .....	185
Buffalo Meter Co. ....	116

Gallery Chemical Company	11, 19, 71, 89, 97
Cambridge Wire Cloth Co., The	193
Camco Fittings, Inc.	102
Catawissa Valve & Fittings Company	97
Celanese Corporation of America, Chemical Division	61
Chempump Corporation	58
Chicago and North Western Railway	12
Chicago Pneumatic	42-43
Chiksan Company, A Subsidiary of Food Machinery and Chemical Corporation	131
Childers Manufacturing Company	166
Clark Bros. Co., One of the Dresser Industries	8
Columbia-Geneva Steel Division, United States Steel Corporation	79
Combustion Engineering, Inc., Raymond Division	136
Commercial Solvents Corporation	68
Conax Corporation	91
Crane Co.	53, 54
Crawford Fitting Company	191
Curtiss-Wright Corporation, Electronics Division	101

Dartling Valve & Manufacturing Co. ....	181
Darnell Corporation, Ltd. ....	142
Davison Chemical Division, W. R. Grace & Co. ....	67
Dodge Manufacturing Corporation ....	189
Dorr-Oliver Incorporated ....	146
Dow Corning Corporation ....	100
Downtown Iron Works, Inc., Division of Pressed Steel Tank Company	152
Dracco, Division of Fuller Co. ....	3
Dravo Corporation ....	89
Ducon Company, Inc., The ....	172
DuPont de Nemours & Co., (Inc.), E. I., Polychemicals Dept. ....	70
Dwyer Mfg. Co., F. W. ....	184

Eastman Chemical Products, Inc., subsidiary of Eastman Kodak Company, Chemicals Division .....	52
Eco Engineering Company .....	128
Emco Corporation, The .....	94
Electric Steel Foundry Company .....	119
Eriez Manufacturing Company .....	134
Ertel Engineering Corp. ....	112
Exact Weight Scale Co., The .....	38
Exolon Company, The .....	91

Falcon Alarm Company, Inc. ....	176
Falk Corporation, The .....	167
Fansteel Metallurgical Corporation, Chemical Equipment Division .....	120

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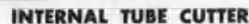


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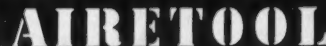


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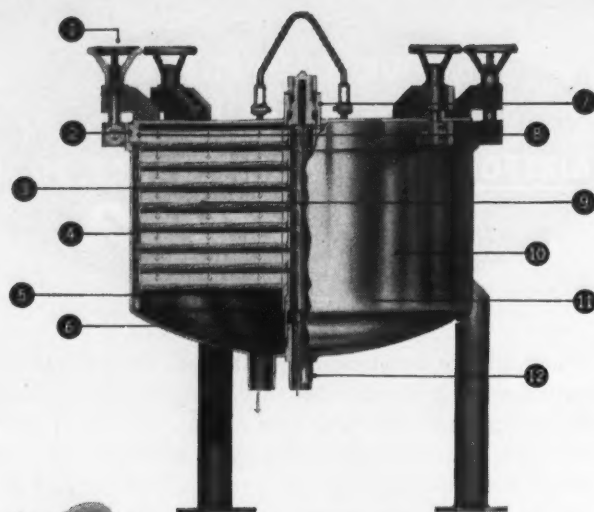
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Check 3132 opposite last page

Felt Products Mfg. Co. ....	181	Jelliff Manufacturing Corporation, The C. O. ....	11
Ferguson Co., J. L. ....	133	Jenkins Bros. ....	137
Fibercast Company, A Division of The Youngstown Sheet and Tube Company	100	Jerguson Gage & Valve Company ....	111
Filter Paper Co., The, Filpaco Industries	184	Jones & Laughlin Steel Corporation ....	20-21
First Machinery Corporation, The	198	Johnson Corporation, The	180

### K

Fisher Scientific	114	Kirk & Blum Manufacturing Co., The	141
Flexitallic Gasket Co.	47	Knox Porcelain Corporation	81
Flexrock Company	198		
Foxboro Company, The	17, 113		
Fritzsche Brothers, Inc.	90		
Fuller Company, Subsidiary of General American Transportation Corporation	138		

### L

Gates Engineering Co.	162	LaBour Company, Inc., The	39
Gates Rubber Company, The	99	Ladish Co., Tri-Clover Division .. 3rd Cover	
Gaylord Container Corporation, Division of Crown Zellerbach Corporation	26	Lapp Insulator Co., Inc., Process Equipment Div.	156
General American Transportation Corporation, Louisville Dryer Division	92	Lenape Hydraulic Pressing & Forging Co.	85
General American Transportation Corporation, Turbo-Mixer Division	151	Leslie Co.	40
General Chemical Division, Allied Chemical Corporation	62-63	Link-Belt Company	15, 140
Gifford-Wood Co.	38	Liquidometer Corp., The	112
Goodall Rubber Company	124	Louisville Dryer Division, General American Transportation Corporation	92
Goodrich Chemical Company, B.F.	66	Luzerne Rubber Co., The	128
Gordon Co., Claud S.	191		
Goslin-Birmingham Manufacturing Co., Inc.	158		
Goulds Pumps, Inc.	121		
Grace & Co., W. R., Davison Chemical Division	67		
Graphic Systems	198		
Graver Tank & Mfg. Co., Inc.	173		
Great Lakes Carbon Corporation, Dicalite Dept.	69		
Gulton Industries, Inc., Vibro-Ceramics Division	192		
Gump Co., B.F.	153		

### G

### M

Hall Co., The C. P.	71	Mack Iron Works Company, The	82
Hamer Valves Inc.	180	Magnetrol, Inc.	80
Hardinge Company, Incorporated	57	Manton-Gaulin Manufacturing Co., Inc.	53
Harrisburg Steel Co., Division of Harsco Corporation	134	Manufacturers Equipment Company, The	194
Harshaw Chemical Co., The	74	Martin Engineering Company	188
Haws Drinking Faucet Co.	170	Marton Equipment, Inc.	190
Helicoid Gage Division, American Chain & Cable	77	Metal & Thermit Corporation	72
Henszey Company	192	Micro Switch, A division of Honeywell	83
Highside Chemicals Incorporated	186	Milton Roy Company	56
Hills-McCanna Company	165	Mixing Equipment Co., Inc.	155
Hoke Incorporated	41	Moisture Register Co.	108
Hooker Chemical Corporation	37		
Hough Co., The Frank G., Subsidiary—International Harvester Company	139		

### H

### N

National Air Vibrator Co.	190
National Aniline Division, Allied Chemical Corporation	2nd Cover
National Distillers and Chemical Corporation, U. S. Industrial Chemicals Co. Division	50 A-B
National Filter Media Corporation, The	150
National Lead Company	122
National Tube Division, United States Steel Corporation	79
Neff & Fry Company	132
Newark Wire Cloth Company	179
Niagara Blower Company	46, 192
Niagara Filters Division, American Machine and Metals, Inc.	196
Nordstrom Valve Division, Rockwell Manufacturing Company	143
Norwalk Company, Inc.	186

### I

### O

I-T-E Circuit Breaker Company, R&IE Equipment Division	81	Orbit Valve Company	110
--	----	---------------------	-----

### P

I-T-E Circuit Breaker Company, Transformer & Rectifier Division	175	Parks-Cramer Company	190
Illinois Testing Laboratories, Inc.	112	Patent Scaffolding Co., Inc., The	85
Illinois Water Treatment Co.	118	Patterson-Kelley Co., Inc., The, Chemical and Process Division	48-49
Industrial Filter & Pump Mfg. Co.	22-23	Pawtucket Manufacturing Company	124
Infilco Incorporated	182, 183	Peabody Engineering Corporation	193
Inland Steel Container Company, Member of the Inland Steel Family	18	Pennsalt Chemicals Corporation	87
International Minerals & Chemical Corporation, Potash Division	73	Perfecting Service Co.	186
International Nickel Company, Inc., The	98, 160-161	Pipe Fabrication Institute, The	127
International Paper Company, Bagpak Division	137	Pitt-Consol Chemical Company, A Subsidiary of Consolidation Coal Company	13
		Pittsburgh Coke & Chemical Co., Protective Coatings Division	123
		Potts Company, Horace T., Speedline Stainless Steel Fittings Division	5

### J

CHEMICAL PROCESSING

Prater Pulverizer Company .....	170
Puget Sound Fabricators, Inc. ....	180
Putman Publishing Company .....	180

## Q

Quaker Rubber Division, H. K. Porter Company, Inc. ....	14
Quickdraft Corporation .....	176

## R

R-P&C Valve Division, American Chain & Cable .....	187
Rapids Machinery Company .....	190
Raybestos-Manhattan, Inc., Manhattan Rubber Division .....	171
Raybestos-Manhattan, Inc., Packing Division .....	159
Raymond Bag Corporation, A division of Albermarle Paper Mfg. Co. ....	141
Raymond Division, Combustion Engineering, Inc. ....	136
Renneburg & Sons Co., Edw. ....	164
Republic Steel .....	90
Resistoflex Corporation .....	130
Robbins & Myers, Inc. ....	9
Robertshaw-Fulton Controls Company, Aeronautical and Instrument Division ..	24
Rockwell Company, W. S. ....	172
Rockwell Mfg. Co. ....	194
Rockwell Manufacturing Company, Nordstrom Valve Division .....	143
Rohm & Haas Company .....	64
Roper Hydraulics, Inc. ....	162

## S

Schutte and Koerting Company .....	194
Sharples Corporation, The .....	148-149
Shriver & Company, Inc., T. ....	10
Sindar Corporation .....	71
Solar Aircraft Company .....	78
Solvay Process Division, Allied Chemical Corporation .....	65
Southwestern Supply and Machine Works .....	89
Sparkler Manufacturing Co. ....	154
Speedline Stainless Steel Fittings Division, Horace T. Potts Company .....	5
Spray Engineering Company .....	188
Square D Company .....	188
Strahman Valves, Inc. ....	82
Struthers Wells Corporation .....	115
Sturtevant Co., P. A. ....	198
Sturtevant Mill Company .....	24
Sun Ship Building & Drydock Co. ....	84
Surety Rubber Co., The .....	176

## T

Taber Pump Co. ....	14
Taylor Instrument Companies .....	104-105
Taylor, Stiles and Co. ....	152
Tennessee Coal & Iron Division, United States Steel Corporation .....	79
Thermal Research & Engineering Corp. ....	4
Thermo Electric Co., Inc. ....	108
Titeflex, Inc. ....	90, 91
Toledo Scale, Division of Toledo Scale Corporation .....	132
Tolhurst Centrifugals Division, American Machine and Metals, Inc. ....	197
Tretrice Co., H. O. ....	184
Tube Turns Plastics, Inc. ....	163
Turbo-Mixer, A Division of General American Transportation Corporation ..	151

## U

Union Asbestos & Rubber Company ....	168
Union Carbide Corporation, Visking Division .....	135
U. S. Industrial Chemicals Co., Division of National Distillers and Chemical Corporation .....	50 A-B
U. S. Stoneware, The, Plastics & Synthetics Division .....	50
United States Gasket Company, Plastics Division of Garlock .....	16
United States Steel Corporation .....	79
United States Steel Export Company, United States Steel Corporation .....	79
United States Steel Supply Division, United States Steel Corporation .....	79
Universal Metal Hose Co. ....	184

## V

Vanton Pump and Equipment Corp., Division of Cooper Alloy Corp. ....	177
Vilter Manufacturing Company, The ....	96
Visking Company, Division of Union Carbide Corporation .....	135
Vogt Machine Co., Henry .....	88

## W

Warren Pumps, Inc. ....	174
Weighing and Control Components, Inc. ....	11
Wellington Sears Company .....	181
West Instrument Corporation .....	108
Williams & Co., C. K. ....	19
Williams Gauge Co., Inc., The .....	11

## Y

Yarnall-Waring Co. ....	144
Young Brothers Co. ....	181

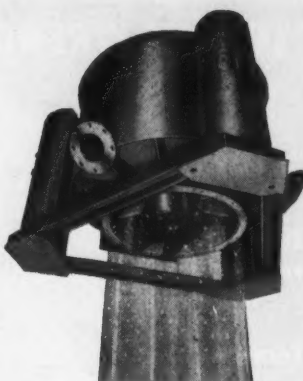
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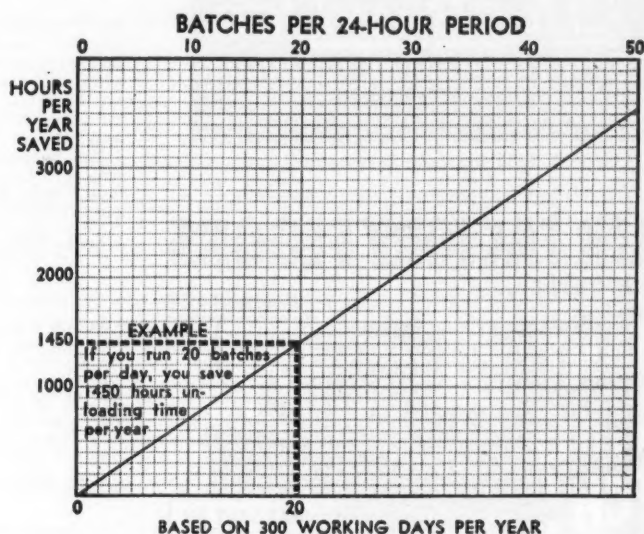
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## NEW LITERATURE

From page 194

State scientific activities are covered in summary report of 62 pages. Report analyzes expenditures of States for conduct of research and development as well as other related scientific activities for fiscal year 1954. To obtain "Scientific Activities in Six State Governments", remit 40c direct to Superintendent of Documents, U.S. Government Printing Office, Washington 25, D.C.

**Self-dumping hopper** applications for handling bulk materials are shown in on-the-job photographs in four-page bulletin that contains construction details and operating characteristics. Chart contains complete specifications for eight standard models. Bul 260 — Roura Iron Works, Inc., 1400 Woodland Ave., Detroit 11, Mich. Check 3136 opposite last page.

**Surface active agents**, their composition, chemical and physical properties as well as physiological properties and analytical methods are described in 16-page technical bulletin. Bulletin contains charts and curves. Tech Bul M-25 — Geigy Industrial Chemicals, Division of Geigy Chemical Corp., Saw Mill River Rd., Ardsley, New York.

Check 3137 opposite last page.

**Glassed pumps** for highly corrosive liquids having temperatures up to 350°F., on all acids except hydrofluoric, and with capacities to 700 gpm and heads to 140 ft, are described and illustrated in Bul 727.3 — Goulds Pumps, Inc., Dept. CP-128, Seneca Falls, N. Y. Check 2880 opposite last page.



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Check 3139 opposite last page

CHEMICAL PROCESSING



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If you check a number having an asterisk (\*) after it, be sure to follow special instructions at bottom of this page.

fol- DECEMBER 1958

Key No.	Description
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[illegible]

**See additional numbers on reverse side**

Continued from reverse side of this sheet

**DECEMBER 1958**

Use this space for writing in specific literature or product designation when you check a number with an asterisk (\*) in accompanying list. Repeat the key number from that list, and follow it with specific bulletin number (or title), or product name, as it appears in article or advertisement. PLEASE TYPE OR PRINT.

2973	3002	3031	3060	3089	3118
2974	3003	3032	3061	3090	3119
2975	3004	3033	3062	3091	3120
2976	3005	3034	3063	3092	3121
2977	3006	3035	3064	3093	3122
2978	3007	3036	3065*	3094	3123
2979	3008	3037	3066	3095	3124
2980	3009	3038	3067	3096	3125
2981	3010*	3039	3068	3097	3126
2982	3011	3040	3069	3098	3127
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2992	3021	3050	3079	3108	3137
2993	3022	3051	3080	3109	3138
2994	3023	3052	3081	3110	3139
2995	3024	3053	3082	3111	3140
2996	3025	3054	3083	3112	3141
2997	3026	3055	3084	3113	3142
2998	3027	3056	3085	3114	3143
2999	3028	3057	3086	3115	3144
3000	3029	3058	3087	3116	
3001	3030	3059	3088	3117	

**Be Sure To Give Your Address**

\*On all numbers having an asterisk (\*) after them, please identify the exact product or piece of literature in one of the blank columns on this and the next page. Write in the key number, as given on the slip, followed by the bulletin number (or title), or name of product in which you are interested.

**Please type or print and be sure to give your title and main product of company**

[illegible]

Company	Main Product
1. <b>Aluminum</b>	Aluminum
2. <b>Aluminum</b>	Aluminum
3. <b>Aluminum</b>	Aluminum
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98. <b>Aluminum</b>	Aluminum
99. <b>Aluminum</b>	Aluminum
100. <b>Aluminum</b>	Aluminum

Street Address of Company .....

City \_\_\_\_\_ Zone No. \_\_\_\_\_ State \_\_\_\_\_

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DECEMBER 1958

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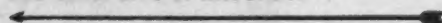
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## NEW LITERATURE

**High-speed chromatograph** is illustrated and described in 20-page catalog of laboratory equipment. Other apparatus described includes color analyzer, glassware washer, integrator for gas chromatograph recorder, pH calculator. "Laboratory, Sept. 1958" — Schaar & Co., 7300 W. Montrose Ave., Chicago 34, Ill.

Check 3140 opposite last page.

**Vibrating screens, their use** and specifications are shown in profusely illustrated 14-page booklet. It contains complete data on company's line of vibrating screen equipment. "Syntron Vibrating Screens" — Syntron Company, 110 Lexington Ave., Homer City, Pennsylvania.

Check 3141 opposite last page.

**Good drawing** to achieve good reproduction is stressed in 32-page manual that suggests techniques for improvement. Designed for use in mechanical drawing classes and reproduction departments, manual is written in three parts covering essential elements, preparation and care, and brief description of reproduction processes of materials. To obtain copy of "Drawing For Good Reproduction", remit \$1.00 direct to National Association of Blueprint and Datype Coaters, 1757 K St., N.W., Washington 6, D. C.

**Cylinder disc filters** with spring seal action which automatically adjusts to further compress filter media after it becomes wet are covered in Bul 19-S — Ertel Engineering Corp., Kingston 3, N. Y.

Check 2856 opposite last page.

**Hollow glass microsphere** product used as dielectric material in molding compounds, radomes, heat barriers, foams, casting resins and ceramics is described in eight-page illustrated brochure. Methods of manufacture and use are discussed, as well as data on material and variety of products made from it. "Eccospheres" — Emerson & Cumming, Inc., 869 Washington St., Canton, Mass.

Check 3142 opposite last page.

**Jar-rolling machine** which grinds, pulverizes, and mixes simultaneously multiple batches of similar or different materials is subject of Cat 79 — Abbe Engineering Co., Dept. 46, 420 Lexington Ave., New York 17, N. Y.

Check 2942 opposite last page.

View showing some of the Tri-Clover fittings and one of the transfer pumps being used in the main processing room at Baxter Laboratories.

**TRI-CLOVER**  
Fittings and Pumps  
guard product quality  
at **BAXTER**  
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For at Baxter Laboratories, as in other important processing operations, users have found that there is no substitute for the high quality and complete sanitation inherent in Tri-Clover products.

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See your nearest **TRI-CLOVER DISTRIBUTOR**

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*Tri-Clover Division*  
Kenosha Wisconsin

Check 3143 opposite last page

The new  
corrosion film  
everyone  
is talking  
about!

## LIFETIME PROTECTION FOR STEEL

Here is an authoritative film that answers many questions on the theory of corrosion and demonstrates methods by which it is controlled. Presented in color and sound, it ranges from the formation of anodes and cathodes through the use of galvanizing, inhibitors, metallizing, cathodic protection, alloys and protective coatings. You will see how many corrosion problems in industries such as yours are being solved by Dimetecote, a one-coat zinc silicate protective coating. This film will be well worth 19 minutes of your time. To arrange a showing for you and your associates, or to learn when it will be shown in your area, contact any of the Amercoat offices listed below.



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- 2404 Dennis Street • Jacksonville, Florida
- 360 Carnegie Avenue • Kenilworth, New Jersey
- 6530 Supply Row • Houston, Texas

### Typical audience reactions:

Bishop, Tex.—“Planning fair-sized test after seeing this film.”  
Louisville, Ky.—“Answers many questions. Second showing arranged.”  
Cincinnati, Ohio—“Key personnel evidenced considerable interest.”  
Netherlands Antilles—“Both shows led to 45-minute discussions.”  
Fairport, Ohio—“Very interesting. Will try methods shown.”  
Las Piedras, Venezuela—“Putting ideas to work in near future.”  
Bartlesville, Okla.—“Viewed by 42 key men from five divisions.”

### Answers these and other questions:

What produces electrolytic corrosion?  
What factors favor hot-dip galvanizing?  
How important is surface preparation?  
Can a coating survive a tank fire?  
Can rust in tankers be controlled?  
Can a coating offer cathodic protection?  
What are the corrosion problems on offshore rigs?  
What are the advantages of zinc silicate?  
How can chemical plants cut painting costs?

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